INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

In This Issue:

Accreditation of Industrial-Arts Teacher Education
Gerald Baysinger

Values of Conferences and Conference Training
N. W. Simons, Jr., and Edward G. Senkewitz

In Defense of the Project
Claude E. Nihart

Vocational Education in Greece
P. Friedel

Cold Typography—Commercial or Shop Subject
R. Randolph Karch

Man's Response to Nature's Wiles

MAN responds to nature's wiles with stratagems of his own. To retrieve mineral wealth from under the inaccessible swamp, the ocean depths and the baffling leafy screen of vast forestlands where nature has concealed some of her best stores of oils and ores and precious materials, he has invented the Airborne Magnetometer. Whenever the Magnetometer is flown across anything in the earth that is magnetic, the device sets up a wild excitement; and there the explorers delve.

So with youngsters in school; in some, nature has made her gifts easily accessible, evident to all. But in others, she has concealed her gifts in the depths of seemingly inscrutable personality or behind a mask that blandly asserts there is nothing here. Yet as old Thomas Hobbes saw so long ago, wealth is even here, and to discover it is but a more *difficult* responsibility the educator must bear if he remains true to his role. What shall be the educator's Airborne Magnetometer? . . . what, but the eager sensitiveness of an attitude that says there is no greater thing in the world than to discover a talent where so little was promised.

The educator must be constantly on the *qui vive* to discover responses and interests in the student that may hint at veins of promise, to be opened up, explored and developed. Such alertness must extend to every point in the curriculum, especially to the classes in mechanical drafting where the creative urge comes near to the surface and where evidence of interest must be developed to the utmost. And the instructor will never demolish all he so carefully builds up by the last intolerable contradiction of saying it does not matter what kind of drafting instruments are used in school. Consistency in his thinking and approach if nothing else will settle *that* question once and for all.

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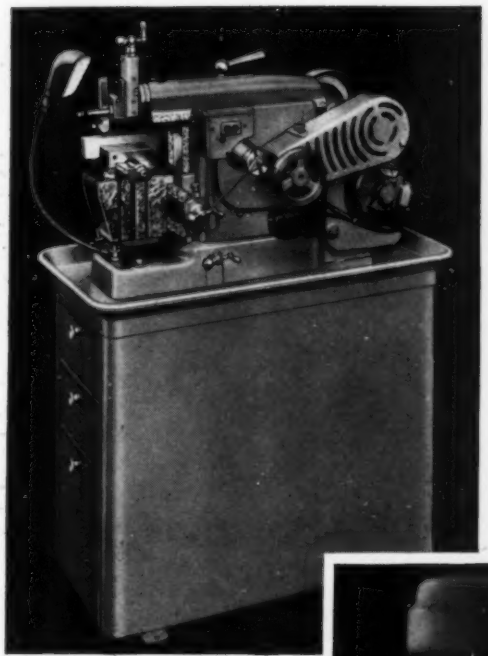

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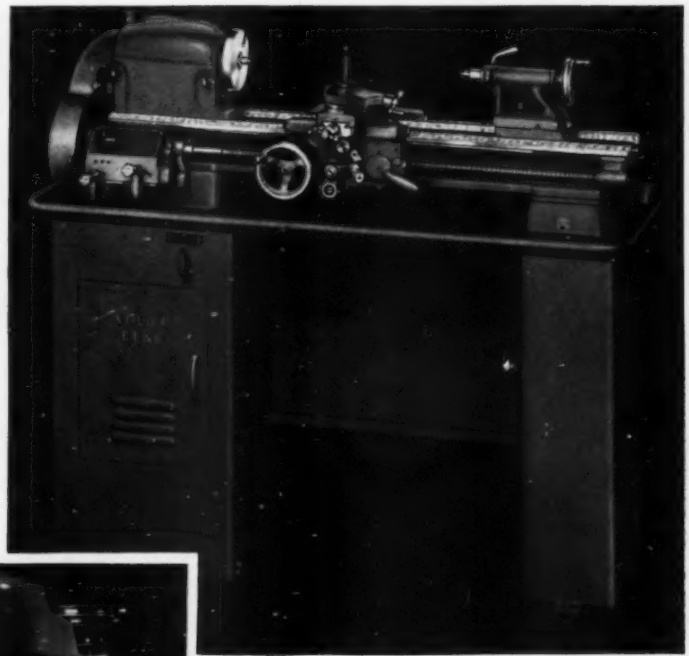

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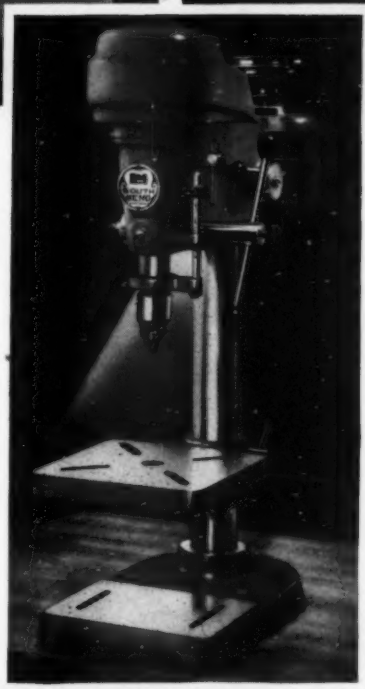

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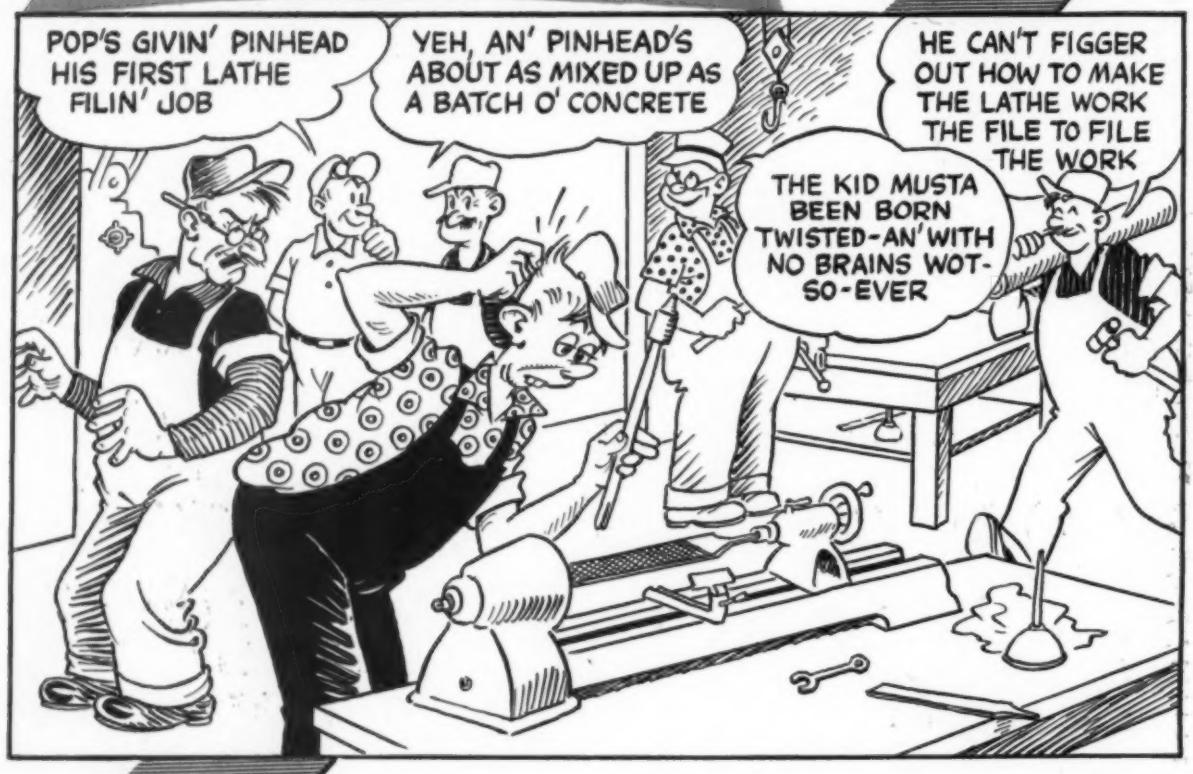
POP'S GIVIN' PINHEAD HIS FIRST LATHE FILIN' JOB
YEH, AN' PINHEAD'S ABOUT AS MIXED UP AS A BATCH O' CONCRETE
HE CAN'T FIGGER OUT HOW TO MAKE THE LATHE WORK THE FILE TO FILE THE WORK
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Season's Greetings

This issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION reaches the readers before the beginning of their holiday season. It is still time, therefore, to greet them with the age-old wish — A Merry Christmas and A Happy New Year.

Publisher and editor concur in extending their greetings and best wishes to our readers, even if the condition of the world is so depressing. Let us hope that the new year will see an end to this dreadful carnage, and that peace and good will be a reality among the nations of this earth.

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Association News

THE A.V.A. CONVENTION

The A.V.A.'s 25th anniversary convention, held November 28 to December 1, 1950, at Miami, Fla., may again be described as having been the best ever.

It is true the registration would have been heavier had the storms in some of the northern states not been quite so severe.

The weather in Miami itself was quite unusual, at least so the Miamians told the visitors; hence, even those from the northern states found a topcoat, especially in the evening, not too warm.

Many occurrences at the convention point out that the relationship between vocational education and industrial arts is becoming more and more amiable and friendly. This is as it should be, since many of the items of related, technical, and shop subjects used by both fields stem from the same sources.

The general session on Tuesday, November 28, at 8:00 p.m., was presided over by President Frank C. Moore. A real international note was struck by C. C. Goldring, director of education, Toronto, Canada, who recounted what the boys and girls of Canada and the United States are already doing to further the good neighbor policy between the two countries.

L. H. Dennis, in his talk entitled "Review and Preview," presented an excellent picture of what the A.V.A. has done in the past 25 years, and what can be expected of the future.

He pointed out with pride that he had personally been active in framing and securing the passage of the Smith-Hughes Act (1917), the George Reed Law (1929), the George-Ellzey Law (1934), and the George Barden Act of 1936.

He also emphasized that the A.V.A. had grown from 2500 to 34,000 members.

Charles W. Sylvester, treasurer of the A.V.A., pointed out that the youth of today, besides the traditional high school, needs also the vocational and technical high school, and the vocational area and regional school.

The Wednesday general meeting was devoted to a discussion of the role of post-high school education by Francis J. Brown, American Council of Education, Washington, D. C., and Clarence Greiber, state director of vocational education for Wisconsin.

In view of the fact that at present 14 million adults continue their education in some form or other, adult education and secondary education must be fostered to the fullest extent. Vocational preparation, too, should be raised to the level of real junior college work.

Industrial-Arts Sessions

The Tuesday afternoon meeting was presided over by Chris H. Groneman, head, industrial education department, Texas A. & M. College, College Station, Tex.

The discussion centered around the question of whether or not to strive for state courses of study for industrial arts, and for standardized teacher training courses in industrial arts.

The speakers emphasized that broad state guidance but not state dictation is required. As to standardization of industrial arts teacher training, much research will be required before this question can be definitely settled.

George B. Cox, head, Department of Industrial Engineering and Industrial Arts, Oregon State College, Corvallis, Ore., was chairman of the Wednesday morning session.

"Community Resources and Industrial Arts" was ably discussed by R. Lee Hornbake, professor of industrial education, University of Maryland, College Park, Md.

It was clearly shown what advantages could be gained if the industrial-arts teachers were

(Continued on page 16A)

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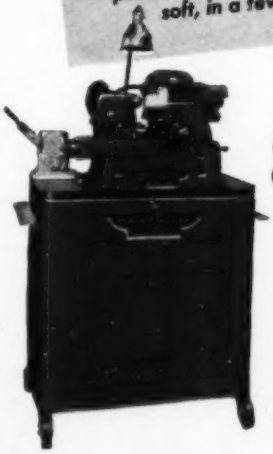

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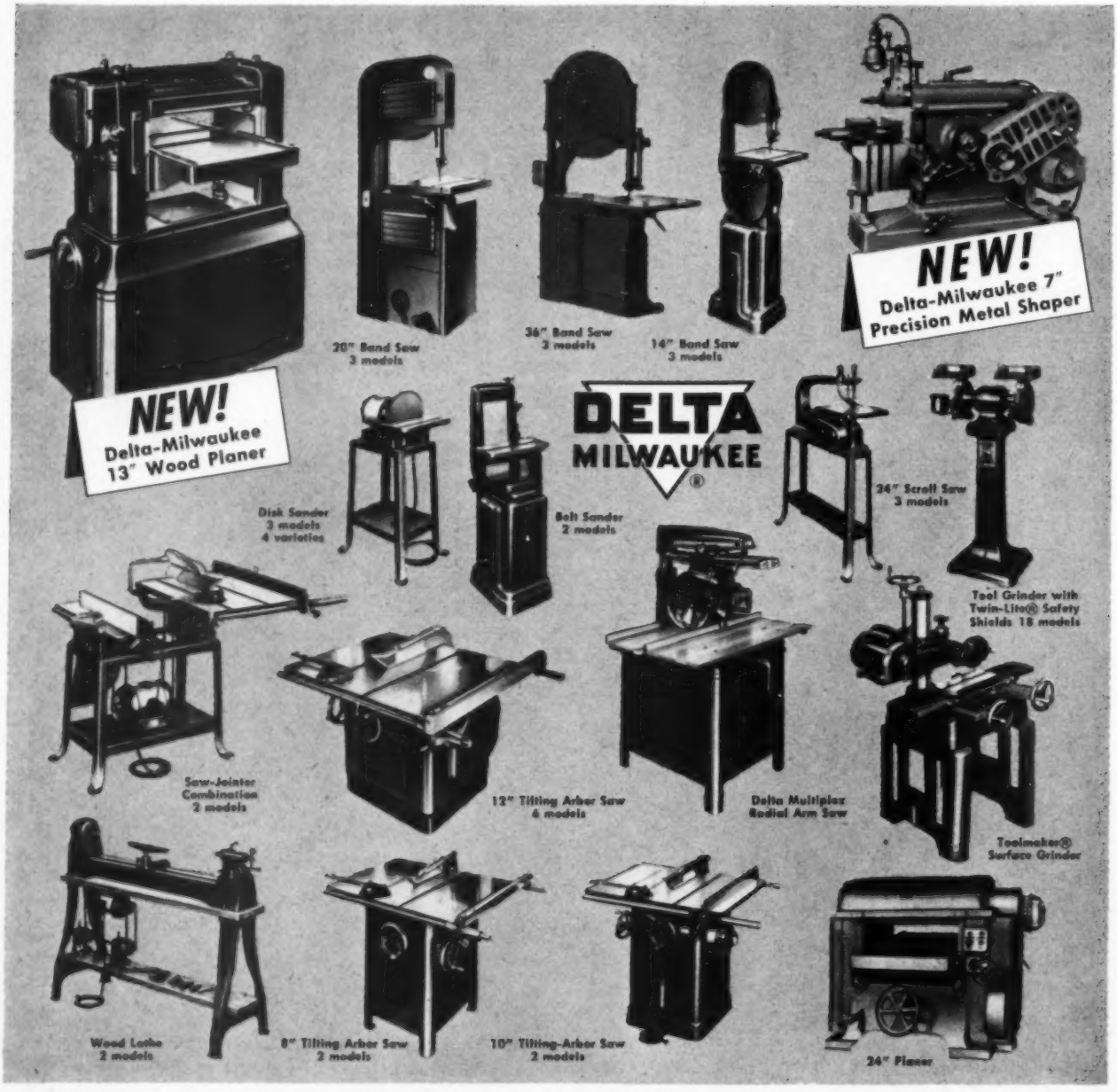

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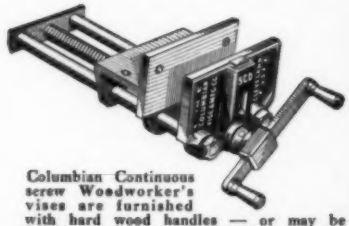

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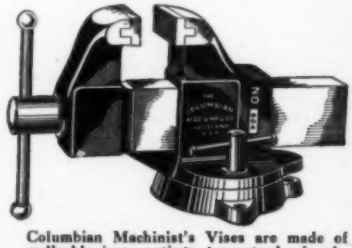

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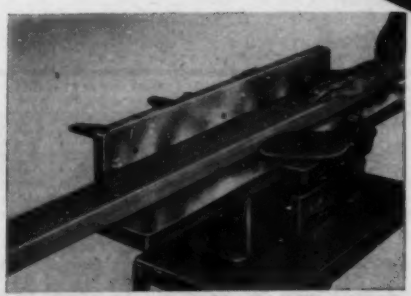

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Each P T I Saw Blade has only 8 teeth instead of the customary 100. These teeth are entirely different from the conventional saw tooth — they project only 20/1000" above the non-cutting edge. Thus the cut of each tooth is "controlled" by the non-cutting edge, in contrast to the ordinary saw blade where each tooth cuts right down to its base. This relatively simple alteration in design actually works miracles in the performance of the saw blade.
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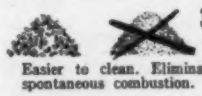

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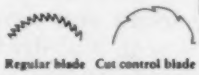

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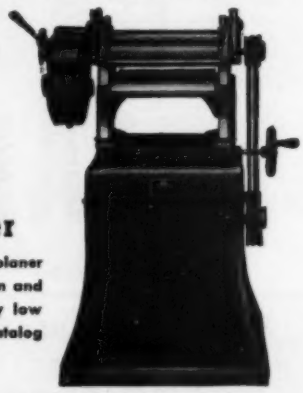

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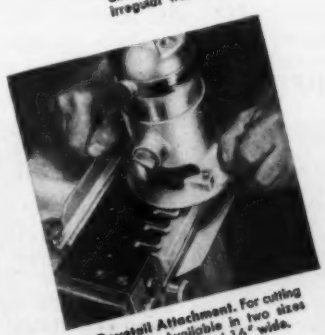

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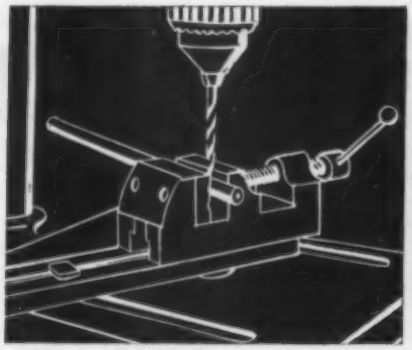

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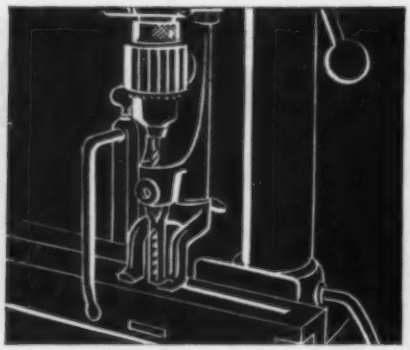

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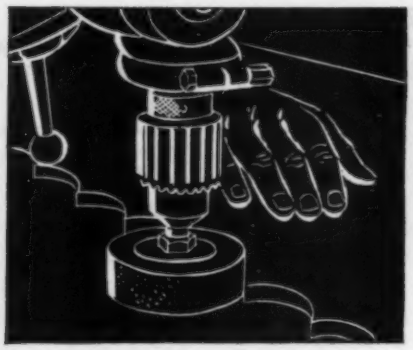

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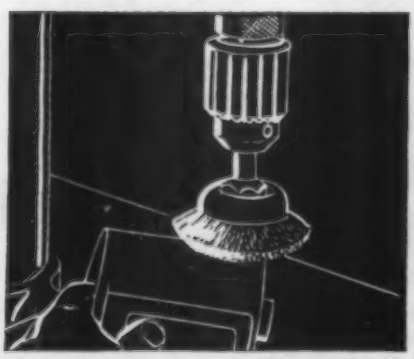
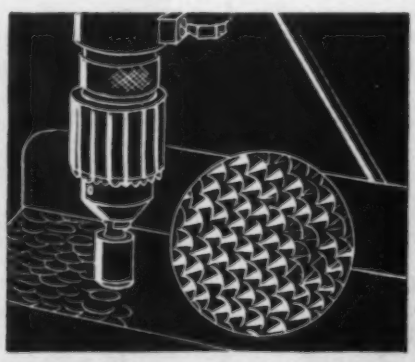


For removing rust, scale and paint—with a wire end brush attached to the spindle, the easily controlled pressure of the drill press readily removes hard incrustations such as these.



For spot polishing and finishing—bare metal surfaces (of machines) can be given a new "precision" finish by using an improvised polishing tool and running drill press at slow speed.

For shaping ornaments—plain faced bits, ground to form the ornament design (and held by the chuck) enable drill press operator to cut ornaments with professional accuracy.

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INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

JANUARY • • • • 1951

Accreditation of Industrial-Arts Teacher Education

GERALD BAYSINGER
Wayne University
Detroit, Mich.

The Problem

The quality of industrial-arts education in the nation's schools depends to a large extent on the quality of preparation of industrial-arts teachers. Determining what is acceptable preparation has not been the responsibility of the profession but has, by legislative action, been delegated to chief state school officers who are responsible for establishing requirements and issuing certificates. But certification requirements are inadequate. Only 24 states, for example, require a bachelor's degree, 4 require 90 semester hours, 14 require 60 hours, and 11 require only 30 hours.[1] Comparisons are startling; in Michigan, for example, one year of professional preparation is required for a teacher's certificate, but two years are required for a barber's license. It is evident that the profession must share responsibility for insuring adequate preparation of industrial-arts teachers, for certification alone is not enough.

Nature of Accreditation

Accreditation is, essentially, a voluntary, co-operative program, of self-improvement. For this purpose, certain standards are needed that will represent best practices in the education of industrial-arts teachers. In addition, criteria are needed to indicate the extent to which an institution meets the previously agreed-upon standards. The program leads to improvement of teacher education; it is not intended to embarrass or discredit any institution nor to force it to discontinue its program of industrial-arts teacher education. Giving approval or withholding approval are not procedures of accreditation.

Instead, the program would work something like this: All institutions preparing industrial-arts teachers would be inspected, provided with copies of evaluation reports, and assigned percentile ranks based upon criteria ratings. College A, finding itself in the 82 percentile, might be satisfied to continue as before. If not, its evaluation report would contain recommendations for improvement which it may elect to make and thus improve its ranking the following year. College B, finding itself at the 37 percentile, would probably move at once on recommendations. If, for example, shop facilities were reported as inadequate, the chairman of the industrial-arts department would ask for an increased budget, and the accreditation report would strengthen his request.

If the curriculum pattern did not allow for necessary professional courses, the chairman's request for changes would receive respectful attention.

Departments, of course, are not autonomous and cannot by themselves make all of the recommended changes but must work within the framework of operation established by the dean of the college of education or the president of the institution. To be effective, accreditation of industrial-arts must be an integral part of a total accreditation program involving all curriculum departments and all services, and institutions must commit themselves to a program of self-improvement.

Industrial arts, along with other professional areas, has had to mark time until teacher colleges themselves were ready to move on accreditation; this is now taking place.

The American Association of Colleges for Teacher Education

The American Association of Colleges for Teacher Education, formed in 1947 by the consolidation of three separate national organizations, now represents 60 per cent of the teacher education business, and is currently engaged in preparing a program of initial inspection to be completed in three years. Adequate standards have already been developed for student teaching and student personnel services; other standards are being prepared. Initial plans provided for college-wide accreditation but, in August of 1950, these were amended so that accreditation by curriculum departments is permissive. National organizations representing professional areas were invited to affiliate with AACTE, and encouraged to submit standards and evaluative criteria.

The Industrial-Arts Standards Committee

Present at the association's 1950 meetings held on the campus of the University of Wisconsin were a group interested in industrial-teacher education which included such people as Dr. Verne C. Fryklund, president of the Stout Institute, and Dr. Harvey M. Rice, president of Oswego State Teachers College. To this group it appeared that, for the training of vocational teachers, standards already existed in the various state plans as provided by the Smith-Hughes Act, and that encouragement should be given to developing standards *only* for industrial-arts teacher education. But not one national organization existed which could assume responsibility for developing standards and criteria! Some teacher educators held membership in the industrial-arts section of the American Vocational Association, others belonged to the National Association of Industrial Teacher Trainers, and still others belonged to the American Industrial Arts Association. The American Council on Industrial Arts Teacher Education, which should accept the responsibility, had only recently been formed and was not yet fully organ-

[1]Dean Ray C. Maul, *Teacher Supply and Demand in the United States*, National Commission on Teacher Education and Certification, Washington, D. C., 1950.

ized. The solution to the problem appeared to be the formation of a standards committee composed of representatives from each of these four national organizations. Accordingly, Dr. Fryklund was urged to devote one session of the Industrial Arts Conference of the Mississippi Valley to a discussion of a proposal to develop standards and criteria thus laying the groundwork for the appointment of representatives from the various organizations. Members of the conference were unanimous in their endorsement, an unprecedented action in the 42-year history of the Conference. In addition, they recommended the appointment of Dr. Fryklund as chairman and Gerald Baysinger as secretary.

In the meantime, the problem has been placed on the agenda of industrial-arts meetings at the Miami Convention of the American Vocational Association. It is expected that all organizations will have selected representatives for the standards committee before the end of the year.

Plan for the Development of Standards and Evaluative Criteria

We have all sorts of standards; linear and volumetric measurements, time, weight, house framing material, and paper sizes are examples. It would be, in fact, very difficult for us to get along without them. An hour is an hour, an inch is an inch, and a 2 by 4 is a 2 by 4, anywhere in the United States and at the same time. But standards do not always, nor necessarily, result in uniformity. Although screw threads, tire sizes, and spark plugs are standardized, automobile designs and performance vary to a great extent. One characteristic of a standard, however, is that it represents common agreement, and to develop standards for industrial-arts teacher education, agreement is necessary.

To secure this agreement, it is proposed that tentative standards be formulated, and first submitted to the Standards Committee for additions, corrections, and clarity of expression. After correction, they will be mailed to each of the institutions preparing teachers of industrial arts with the intent of determining majority opinion. It is hoped that the industrial-arts faculty of each institution will study the standards carefully and that their recommendations will represent the best thinking of their institution. Because it is necessary for the standards committee to move rapidly, it is hoped that institutions will co-operate by making returns promptly.

If the first mailing does not reveal common agreement, additional lists of standards will be submitted to institutions until agreement is reached.

With standards accepted, criteria will be developed and submitted to the standards committee for review. Development of evaluative criteria is a technical matter in which the chief problem is to devise an instrument that will reveal the extent to which institutions practice previously agreed-upon standards.

Finally, the standards committee will recommend the completed standards and criteria to the American Association of Colleges for Teacher Education for inclusion in the total accreditation program for future use.

Accreditation of industrial-arts teacher education is a long-looked-for development, and an indication of the maturing of industrial arts as a profession. In accepting our share of the responsibility for the quality of industrial arts in the public schools, and in subordinating personal likes and dislikes to the improvement of industrial-arts in order that children of America may best be served, we will have demonstrated the high ideals for which industrial arts stands.

Electricity in the Industrial-Arts Shops

MARSHALL L. SCHMITT
Instructor of Electricity
Oswego State Teachers College
Oswego, N. Y.

The importance of teaching electricity today cannot be overestimated because almost everyone uses electricity in one form or another — to ignite the gasoline vapor in the family automobile, to make toast in the morning, to read by electric light, to listen to the radio or to talk on the telephone.

Electricity is so common in our everyday life that we accept it almost without question. The homeowner's direct contact with this form of energy comes every month when he receives the bill from the power company. Many people pay their electric bill not knowing exactly how it is computed nor the problems involved in maintaining this service to their home for their convenience and use.

Electricity played an important part in the successful conclusion of World War II, and it is doing the same at Korea. It is our technical understanding of electricity and its application to swift communication that aids immeasurably in combating the enemy. Because of it, United States ships can fire salvo after salvo at enemy ships or locations without seeing them with the naked eye. Radar makes this possible. As a result of that application of electricity, some airline companies are directing aircraft to successful landings in fog; yes, even ferry boats now utilize radar, resulting in the saving of many lives.

The problems confronting the average citizen concerning electricity are manifold. The government for some years past has been carrying on a program for the conservation of energy resources. Boulder Dam, Grand Coulee Dam, Tennessee Valley Authority are some examples of multipurpose projects. Citizens of many communities are asked to vote on the advisability of a municipal power plant versus a private company. Yes, an understanding of electricity is necessary if an individual is to take his rightful place in our modern society.

Electricity and Industrial Arts

The industrial-arts shop can do a great deal toward developing well-informed future citizens. The study of electricity is one of the contributing parts of the industrial-arts program. If it is taught poorly, it can be like a weak link of a chain and be of no avail when put to use. If it is not taught at all, the student is not given an opportunity to work in that area of indus-

try; thus a wide gap in his understanding of modern society is left out.

Electricity well taught in the industrial-arts shop helps the student develop:

1. The ability to make intelligent selection and purchase of electrical devices.
2. A definite knowledge of household electrical appliances.
3. An appreciation of the problems involved in the struggle to obtain these conveniences of our modern culture.
4. A degree of skill in maintaining electrical equipment for uninterrupted service.
5. An interest in the ever widening vocational possibilities in the electrical and its allied fields.
6. An appreciation of the great variety of avocational activities in which many individuals participate and enjoy.
7. The ability to think critically about problems that are world wide, such as: atomic energy, and conservation of natural resources.

The industrial-arts shop is ideal for accomplishing the foregoing points, and for offering a challenge to the superior student to open new areas for research and study. Each student has the opportunity to test, operate, investigate, observe, and construct projects which show the wide variety of applications to which electricity can be put.

In an analysis of the modern *electric* home, it is amazing to note that over 40 appliances consume electrical power. The following list is given to point out the adaptability of this energy to meet our changing needs.

Heat: iron, toaster, portable heater, stove, mangle, coffee percolator, waffle iron, electric blanket, baby bottle warmer, hair dryer, water heater.

Power: oil burner, washing machine, refrigerator, food mixer, transformer, razor, fan, deep freeze unit, clock, sweeper, sewing machine, garbage dispenser, air conditioning unit.

Light: incandescent lamp, fluorescent light, sun lamps, heat lamps.

Electro-Magnetic: bells, chimes, buzzers.

Chemical: flashlight.

Communications: radio, phono recorder, telephone.

Control: switches, thermocouples, fuses.

Miscellaneous: electric wire, extension cords, photographic light meter, watt-hour meter.

New devices: television, radio-facsimile, return speech.

Electricity and Consumer Education

The list shows a great variety of electrical appliances which are used in the modern home. Since each one of us undoubtedly will become consumers to some degree and purchase various types of electrical equipment, is it only natural that we should analyze what we buy?

The Consumer's Union, which is a non-profit organization, evaluates many articles used in the home. Electrical appliances of varying types are reported on from time to time. These reports are as free from bias as it is possible to make them.

To illustrate the need for developing the ability to make intelligent selection of electrical appliances, this writer wishes to quote several reasons why certain electrical devices were not acceptable to the Consumer's Union.

The *Consumer Report* of March, 1947, claims that in testing several different types of electric toasters, it was found that some were not acceptable because of: (1) "Serious short-circuit hazard." (2) "Handles uncomfortably hot for carrying after toaster had been in operation a while. Not acceptable because samples failed voltage breakdown test."

On another occasion, the *Consumer Report* indicated several portable radios that were not acceptable because: (1) "Short circuit hazard over whole of metal cabinet. . . . No underwriters' label." (2) "Speech reproduction on both samples tested was practically unintelligible due to lack of treble."

In another issue, electric fans were tested. Some of these did not have switches, making it necessary to pull the plug from the wall in order to turn the unit off.

The answer to the question, "Do consumers need to analyze what they buy?" should be, "Yes." The school with an industrial-arts shop can effectively show the need and clearly take the necessary steps to analyze electrical appliances. For instance, the shop teacher can point out and demonstrate what to look for in purchasing a radio. He can compare a radio set which has good fidelity, sensitivity, interference rejection, volume, and tuning range with a radio that has poor qualities. Other apparatus and appliances can be analyzed, in other ways, by using the facilities of the shop.

The student can, with proper instruction, build a small radio as a shop project, or repair his mother's electric sweeper, just as well as he can make a bookcase.

Understanding Electrical Transmission Problems

Last fall, due to a severe drought, a power company in New York State was faced with a critical shortage of available water power. The problems involved in maintaining sufficient power for industry and home consumption were enormous. The company fortunately, through using a complicated distribution system, was able to borrow electrical power from localities which had an excess. The electrical power was then sent over high tension wires to supplement the deficit. In this way, industry still maintained its high level of productivity and homeowners had enough to meet their needs.

Sometimes electrical power is cut off temporarily during an electrical storm or by other "acts of God" and people complain because of the inconvenience. Many of these complaints are unwarranted because most people do not understand the problems involved in maintaining 24-hour service. Few people know that electrical storms cause main circuit breakers to trip automatically, thus opening the power line. When this occurs, an indicating light flashes in a control room and an immediate repair crew is sent out to ascertain the trouble and repair it. Furthermore a constant watch is kept on all distribution systems to correct any power interruptions as they occur. A little knowledge of the problems involved in maintaining electrical power so that it is available at all times to the housewife, worker, and businessman would undoubtedly give more breadth of understanding to our modern culture.

A man who cannot be handy about the house is as useless as a broken lamp standing in the corner. A great deal of satisfaction and the saving of needless expense can be derived through a little knowledge of how electrical appliances operate. The homeowner can make many minor repairs from tying an underwriter's knot in a lamp cord to wiring the garage or cottage.

Electricity, if offered in the industrial-arts shop, can do a lot to encourage the highly intelligent student to worth-while activities. The field of radio challenges the individual to put his talents, through study and experimentation, far above the capabilities of the group as a whole. Too often the classroom and shop instructors teach only the average child and neglect the superior student. Many a problem child is a student capable of doing the assigned work with ease and with plenty of time left over for "fooling." Electricity offers a challenge to the superior student in design and experimentation and to the slow student in operation and maintenance.

One of the main objectives of industrial arts is to give an insight to the variety of vocational pursuits. Electricity, if omitted from the comprehensive general shop program, leaves a wide gap that cannot be adequately filled in any other place in the school program. Necessarily so, that program has failed in fulfilling that objective. Thus, some student is deprived of an op-

portunity to try out his ability which later may prove to be his life's occupation.

Electricity and the Use of Leisure

Every day many police courts are filled with young people of school age who have used their free time in the wrong way. The problem of these juvenile delinquents in many cities is of major concern. The industrial-arts teacher can help prevent many youths of school age from being brought to police courts or sent to reform schools by guiding their thoughts and efforts to purposeful activities. Among these are electrical appliance repair workshops, radio service shops, amateur radio stations, and radio controlled airplanes. These activities can develop into hobbies that may last a lifetime, and in some cases may offer a livelihood. The avocational possibilities inherent in the industrial-arts shop should not be limited to in-school youth. The shop should be opened at night to draw in and advise out-of-school youth and their parents.

Today, with the nations of the world debating over the problems affecting us directly in one way or another, it is absolutely essential that the public school system of this nation be alert to both sides of the discussions that will eventually mold our futures. It is not enough for students to study and construct projects involving the technical theory of electricity. They should understand the social-economic implications that this energy offers to mankind. The present-day struggles over atomic energy, advisability of the St. Lawrence Seaway, Columbia River Power Projects, and many others should be discussed pro and con in order to stimulate critical thinking on the part of the students.

The industrial-arts shop that includes electricity as a part of its curriculum and utilizes its potentialities to a high degree is contributing to the over-all objectives of education; and the shop which does not include electricity in the program cannot possibly fulfill its obligation to the students who are in attendance and are to be educated for present-lay life.

Values of Conferences and Conference Training

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and
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If there is one type of method of learning under which individuals and groups can progress successfully, it is the *conference* method. Not only do individuals and groups benefit, but various types of organizations can reap advantages through the multiplicity of objectives obtained and the use of the techniques of conferences.

The word *conference* is one that is used rather freely and with a variety of meanings. In order to clarify the meaning of the word, it may be well to start with a definition as: A conference is a meeting of a group of people interested in a common problem, and who, under the guidance of a trained leader, contribute out of their experiences and knowledge, thus pooling information which usually leads to a solution of the problem.

There are two distinct types of conferences — the informal and the determinate discussion. This paper concerns itself with the latter type in which the discussion is carefully directed by a leader into specific channels through the use of a detailed plan.

Benefits to the Individual

The benefits to individuals taking part in a conference or conference training program are many. They learn to appreciate the value of this method since it covers more ground with a more complete absorption than other learning methods. The self-confidence of individuals is improved through participation that is encouraged by the size of the group (normally 10 to 15 members), the seating arrangement, and the techniques used by the leader. Through the repeated use of a conference method, let's say, Jackson's* — the individual develops logical thinking habits which can be used to advantage in the discussion of any problem that concerns him.

A knowledge of the techniques of conference leading is required of every conference leader. It is essential that leaders know how to set up a problem, confine the discussion to the problem, get participation out of backward people, control talkative ones, and how to question. Moreover, a knowledge of the techniques of conferences will aid the individual in many situations since they can readily be adapted to public speaking and to other phases of learning. Another outstanding value is the training in leadership which individuals receive. Through participation and criticism, they are constantly reminded of what to do and what not to do in leading a group. They learn rather early that a leader should not monopolize a discussion like a school teacher, but should be patient, alert, encouraging, and questioning at all times.

When an individual is called upon to contribute something toward a solution of a problem, he has a feeling that he is more than just a cog in a wheel, therefore, we may say that the conference method promotes the individual's "sense" of sharing. In all cases, the individual's knowledge of a subject is broadened, and, when proper recognition is given, he is encouraged to participate more freely in any discussion group of which he may be a part.

The Conference Program

Conference programs promote better understanding between the group members who usually are able to see that their problems are similar to any type of organization. In solving these problems, the combined knowledge and experience of the

*See Jackson's Plan at end of article.

group is applied which, in itself, should promote co-operation within the group.

Through this co-operative effort, the group finds that the conference method is a faster, more efficient way of getting a solution to a common problem. Morale is increased and relationships are improved as a result of conference sessions.

Practice shows the value of a plan to follow in leading a conference. Preliminary plans enable the leader to present the case to the group. They give the objectives the group should try to obtain and leading questions which enable the leader to secure the desired information necessary to solve the problem.

The value of a *follow-up* is brought out through the setting up of a plan of action which the group thinks desirable. This plan may be totally different to the one that the leader used in starting the conference. The group may do a splendid job in solving the problem and in making necessary recommendations. However, unless a committee is appointed to see that the plan of action is carried out, the work of the conference is wasted.

The conference may be used in any type of organization as a problem solving device, as a teaching method, or as a means to getting co-operation of all involved. Most of the organizations that are set up to train foremen in industry use the conference methods. Additional organizations in which the conference could be used to advantage are: fraternities, school faculties, civic, religious, and social groups.

Things to Be Accomplished

There are many objectives obtained through the use of conferences some of which may be such as the following:

a) Securing a composite opinion which may be used directly in establishing a new policy or modifying an existing one.

b) Modifying the viewpoint of some or all of the group members for the purpose of securing teamwork.

c) Solving problems of a technical nature.

d) Setting up a more efficient sequence of operations in production.

e) Helping each member to analyze his job, identify his responsibilities and discovering better and more effective ways of meeting them.

f) Assisting each member of a group to organize his experience to the end that it may be of increased value to him on his job.

g) Making analysis of situations or cases involving joint responsibilities in order to secure a smoother working organization.

The conference is one of the oldest devices known in solving problems. Yet, it took a war to put the conference into its rightful place as a problem solving method, and the results obtained through its use are and have been encouraging and gratifying. We can expect more use of this method in the future through the endorsement of the conference training programs by those organizations which have solved problems by conferences and know their values.

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5. *How to Train Supervisors*, R. O. Beckman.
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JACKSON'S PLAN

1. Select and Define the Problem
   - Problem clearly stated
   - Problem understood by group
   - Problem of interest to the group
   - Problem one for group action
   - Problem solution possible by conference method
2. Develop the Data
   - Collect the data
   - Analyze the data
   - Chart the data
   - Evaluate the data
3. Conclusions
   - Summary
   - Recommendations
   - Follow-up

Closing the Conference
- Present complete review
- Secure final approval from group
- Congratulate the group

Co-Educational Arts and Crafts

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and
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What is the role of the industrial arts in a teacher's college? The curriculum is ordinarily intended to provide a liberal background of experience and appreciation for the materials and processes common to our American existence. Traditionally, the greater share of these courses have appealed

Leatherwork by students at Southeast Missouri State College

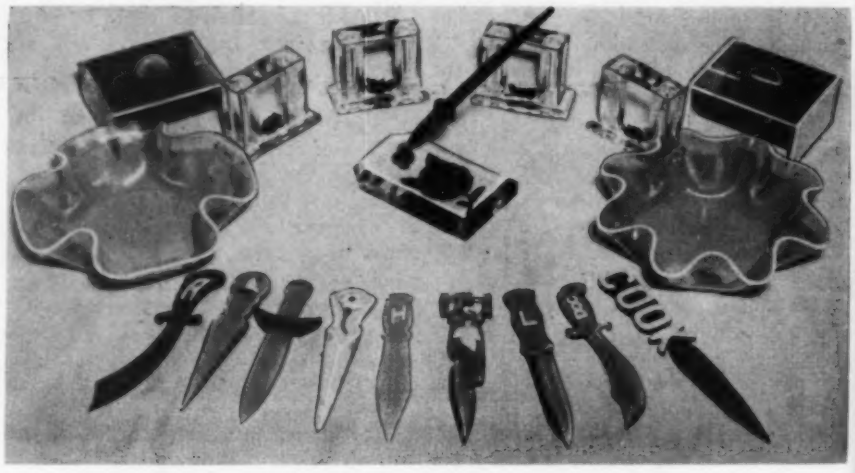
to male students preparing to teach in the secondary school. Courses in practical and applied arts designed to meet the vocational and avocational needs of women are on the increase.

Within recent years women have felt free to explore those areas of industrial arts from which they were indirectly excluded in college curricula. Their creative accomplishments, however, show that women have demonstrated an aptitude and skill in craft activity which frequently exceeds that of men students.

The recognition by public school administrators of the value of handicrafts and practical-arts experience for elementary grade pupils is an encouraging trend. Yet many teachers who lack basic skills and concepts in handicrafts continue to teach and supervise the teaching of this area. Much credit for expanded arts and crafts must be given men of vision in the positions of public school superintendent, principal, and supervisor. Of significance in this expansion has been the co-operation of realistic, aggressive personnel acting within the professional education staffs of teacher-training institutions. Authorities in education and psychology have now and again been charged with an academic bias. Their viewpoint regarding the primacy of the "three R's" is recognized. It is most gratifying, therefore, to have this evidence of current awareness. Their combined perspective helps bolster a vital area in teacher preparation.

There are indications that college departments included within the administrative division of vocational and fine arts, are tending to recognize the complementary elements in their respective fields. Especially, the areas of fine arts and industrial arts are evolving programs which acknowledge an essential unity. Of late, many of our colleges have noted growing numbers of women participating in practical and applied-arts courses. The contribution made by industrial arts is most significant. We are favorably situated with respect to equipment, professional teaching method, and we have skilled personnel who are able to carry on a rich variety of subject matter. The growth of the composite general shop and also the broader development of unit areas have contributed greatly.

Industrial arts offers women and girls opportunity to participate in leather, plastics, wood carving, toy construction, furniture design, ceramics, block printing, art metal, jewelry and lapidary, metal spinning, home mechanics, and many other craft activities. It is apparent that with the development of new materials, new processes, and new craft media we thereby enrich industrial arts when our enrollment becomes no longer exclusively male. The interchange of students between the fine arts and the industrial arts is wholesome. To diminish compartmentalized education is to enrich teacher education. Each department can benefit by the leavening process.

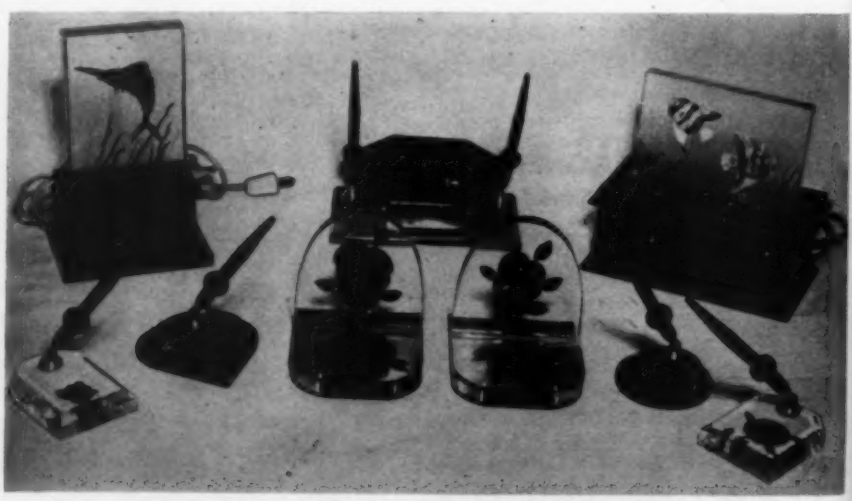


Plastic projects made at Southeast Missouri State College

New Materials and Processes

At least two important craft media have been altered through current improvements in materials and techniques. Leather and plastics are examples. Interest in so-called western leather carving, a form of incised tooling and design, has been hastened through publications of regional authors. Within recent years creative artists have made available the professional techniques of leather carvers of the American southwest. With the appearance of excellent books and instructional folios on western carving, our schools and colleges have had a considerable following in this fascinating subject.

Interest in plastics has been influenced through improved techniques in the internal carving and dyeing of acrylic resins (Lucite and Plexiglas). The technique of internal carving furnishes a three-dimensional effect when an opening, carved in a block of transparent Lucite or Plexiglas, is colored with brilliant aniline dyes. The design is commonly a floral or animal motif which gives the effect of a natural, living form in all its beauty embedded in a block of clear plastic. Compact units consisting of a small, high speed motor with a flexible shaft have been designed for craftsmen to do this type of work. Now it is possible for the student to create beautiful examples in plastic comparable to the efforts of professional artists.



Plastic projects made at Southeast Missouri State College

Drawing as a Part of General Education

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One who makes drawings with the proper understanding, and of the type that have real significance, must do much more than draw lines or copy the exact work of another without careful thought. He must draw and plan intelligently and express his own ideas as soon as he has gained a working ability of the techniques involved.

The broad general education developed through drawing is brought about by extensive interests and studies about the things being drawn and the things that one must know to plan drawings intelligently. These studies and understandings are sometimes of greater significance and value than the drawing itself for they apply in many practical ways other than those expressed by a single drawing. Let us consider the following:

If, when one draws a simple form for use in keeping records, he studies many forms and their uses and learns about many applications of drawing in making such forms, he gains valuable knowledge far beyond that involved in drawing the form alone, and the drawing techniques developed can be used as extensively as desired in the future or in meeting present situations.

After one has learned how to draw a simple building plan, he may use this ability to work out plans of his own and in connection with this drawing and planning learn about desirable room sizes, arrangements of furniture, types of plumbing fixtures, building materials, types of houses or cottages, and many other things of great value when planning or purchasing a home.

The drawing of a plot, or landscape, plan may well lead into the study of lot sizes, subdivision layouts, how to procure property, the deed and abstract of title, and many other things about the property. It may also lead to the study of desirable types of trees, shrubs, and flowers for landscaping effects which is exceedingly interesting and valuable.

When one plans or sketches a job to be printed, he may well learn about the various kinds of type, good designs, and the lettering by hand, not only for that particular job, but for general use; such as in filling out forms, applications, and the like. Thus, in the future one may not only use his ability to letter but also to specify types of printed matter he may desire.

When one learns to make simple working drawings of things to be made of wood, plastics, metals, leather, or any other materials of construction, he should learn about the materials and their uses and many of the things for which they are especially adapted. Thus he may design and plan intelligently the things to be made, and he may purchase with more certainty as to consumer values. He may also learn about details of construction such as used with metal or wood, and perhaps something of the tools and machines required to make certain products. Through this one should gain a greater appreciation of the products of labor and the many processes involved.

When one learns to draw simple diagrams of electrical circuits, he should draw them not necessarily with the idea of becoming an electrical worker but to gain an understanding of the electrical system in a home and the safety precautions that should be observed in using such a system. This understanding is a necessity for everyone in our present age of electric power and one who cares to study extensively may enter some field of electrical work with better understanding of the fundamentals involved.

Thus drawing becomes the basis for true and valuable general education.

In Defense of the Project

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Occasionally industrial-arts supervisors and teacher-educators are prone to poke fun at the emphasis placed on the project in industrial-arts classes. But not so the industrial-arts teacher on the *firing line*. He sees in the project something more than a mere *interest getter* and let us not depreciate this factor either. We know teachers who would give their *eyeteeth* for a few well-selected *interest getters*.

How about investigating a typical woodwork project? Assuming that the student wants to make something to meet a definite need, say a pair of high-jump standards, what are the values that accrue other than interest getting?

1. He develops ability to plan on paper, he does an elementary bit of research about what kind of wood to use, how to design the standards so that they will not tip over, how the pegs on which the crossbar rests are made and fit into the uprights, and how the uprights are fastened to the base.

2. He makes a practical application of mathematics in checking off the stock bill from the drawing, in figuring the costs of lumber, and in accurately laying out the graduations on the uprights.

3. He develops manipulative skills since he is anxious to have a pair of standards that are well constructed, sturdy, and accurate.

4. He explores the woodworking occupations by participating in typical manipulative experiences of the occupations. He has ample opportunity to use the rule, handsaw, plane, chisel, brace, auger bit, hand drill, and screw driver. If he is allowed to use woodworking machines he gets experience in adjusting and operating the circular saw, jointer, band saw, and drill press.

5. Since he has learned to use the hand tools and woodworking machines it may be

the beginning of interest in the home workshop where hobbies are developed and home repairs are undertaken.

6. He investigates the kind of finish that will withstand outdoor weather conditions; he mixes and applies the finish with brush or spray gun.

7. He has the satisfaction of a job well done and the joy of creating something useful.

8. In using the high-jump standards he builds a sound body and enjoys a healthful recreational activity.

The foregoing are only a few of the values that accrue.

We, as industrial-arts educators, must not sell the project short. Others recognize its importance. The Ford Motor Company spent thousands of dollars in sponsoring the Industrial Arts Fair held in Chicago last summer where projects from school shops in 38 states were displayed and competed for prizes.

The Midwestern Ohio Industrial Arts Association recently spent considerable time, effort, and money to publish a 111-page project book for its members. Manufacturing concerns, such as Stanley Tools and Delta Division of the Rockwell Manufacturing Company, for years have developed project drawings for industrial-arts classes. Scientific, mechanical, and craft magazines contain many plans for things to make in the home and school workshops.

Interest and learning combined

Recently, dozens of project books have been published for school use.

While the project is not the primary objective of industrial arts, yet it looks as if many people consider it quite important. As the design, craftsmanship, and utility of the things we make in the school shop improve, so will the public esteem for industrial arts increase. The project is a weathervane which points the way to many rich values inherent in the industrial-arts program.

Some Leaders in Industrial Education

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(Continued from page 385 of the December, 1950, issue)

WILLIAM HORACE NOYES (Concluded)

Outside Interests

One notable characteristic of William Noyes was the broad range of his interests. For one thing, he was a constant and omnivorous reader. "Brief quotations from Froebel, Pestalozzi, Rousseau, Bacon, Ruskin, Goethe, Hegel, Kropotkin, Eliot, Morris, Stevenson, Browning, Triggs, Hobson, Lanier, William James, and many others, were posted from time to time on his bulletin board, for his students to read and think about. Dewey's philosophy was studied earnestly, and applied in his teaching."

After he "found himself," as a teacher of industrial arts, and especially after he went to Teachers College, and began to experience some feeling of security, he began to "identify himself with movements offering betterment to the great mass of the exploited — the Consumer's League, the Single Tax, the Cooperative Movement, Votes for Women — with Dr. Dewey and a few other men he joined the valiant women in that first suffrage parade on Fifth Avenue — Socialism (he voted for Debs, went to hear him in Hackensack, pitied him in prison)."

"He read extensively in the literature concerned with civilization's complicated problems — *The Freeman, The Nation, The New Republic,* and such authors as Thorstein Veblen, George Bernard Shaw, Ida M. Tarbell, Charles A. Beard, Harry Elmer Barnes, Bertrand Russell. He was in sympathy with Clarence Darrow's fighting for the underdog, and counted it one of the greatest honors of his life to have been summoned to breakfast with Darrow as he was passing through Albany. He always admired Jane Addams. He signed the plea to save the lives of Sacco and Vanzetti."

Searching my memory for recollections of significant events we shared, I recall very vividly two occasions when he invited me to attend meetings of the "X-Club" during the period of my graduate study at Teachers College. The Club met for dinner in the private dining room of a midtown restaurant. It was an informal organization, although I recall no details. There were about 18 to 20 men gathered about a single long table, with many lively exchanges during the serving of the meal, with great good humor, clean fun, and abundant congeniality.

Following the dinner, someone posed a question or problem of current interest, with an introductory statement of five minutes or so. Whether this was by prearrangement or assignment I do not recall, although I believe there was a chairman or spokesman to keep the discussion from wandering too far off the subject. Something in the nature of a round-table discussion or forum then ensued, lasting until all who cared to be heard had spoken. Someone then introduced another topic, and the procedure was repeated. The party broke up somewhere around 11:30 o'clock, just as informally as it began.

The Quality of Friendship

One thing that remains vividly in my memory is the caliber of the men who were assembled around the table. One of the colorful figures was Dr. Woods Hutchinson, a popular writer on health topics, several of whose articles I had read in *The Saturday Evening Post* and other magazines of that period. Another was Dr. Hamilton Holt, then owner and editor of *The Independent*, a weekly journal of opinion which was later merged with another weekly. Dr. Holt recently retired after a long period of service as president of Rollins College, Winter Park, Fla. Another was Dr. Edwin E. Slosson, at that period literary editor of *The Independent*, and later director of Science Service; also Dr. Ira S. Wile, at that time one of the editors of *The New Republic*. There were two newspaper editors, one from the *New York Times*, and one from the *Brooklyn Eagle*, and others around the table whose names and connections I am now unable to recall.

One prominent member of the Club was Dr. Walter E. Weyl, author, economist, and one-time statistical expert for the U. S. Treasury Department. He was a member of the Arbitration Board set up by the employers and workers in the Cloak, Suit, and Skirt Industry. Incidently, it was in connection with the survey of working conditions in this industry, conducted under the authority of the Arbitration Board by the U. S. Department of Labor, that I spent a year of study in the factories and wrote my Doctor's Dissertation, *A Study of Occupations in the Cloak, Suit, and Skirt Industry, and an Apprenticeship Plan for Cutters.*

It was indeed a thrilling experience to find one of my close personal friends, an "industrial-arts teacher" like myself, at home in the company of brilliant writers, lecturers, journalists, publicists, and in other ways molders of public opinion. Not only did I acquire a new and heightened pride in my calling as an educator, but increased respect and admiration for Professor Noyes because of his broadening contacts with leaders in other fields.

In addition to membership in the X-Club in New York City, which he maintained for more than 20 years, and membership in the Whetstone Club in suburban Leonia, Noyes was later a member, and president for one term, of the Albany Chapter of the Adirondack Club. He was also for several years a member of the Albany Philosophical Society, before which he spoke several times. One of the officers of the Society said of him: "Mr. Noyes was appreciated for his broad scope of interests, his youthfulness, freshness, and eagerness in response to every form of intellectual problem, and the invariable good nature and humor with which he met all arguments. For a man of his years he was singularly free of the usual ossification. Openness and optimism perhaps best characterized his mentality."

On another occasion, in recognition of the almost phenomenal range of his active associations and acquaintanceship, especially outside the educational profession, someone exclaimed, "Who doesn't Mr. Noyes know who is worth knowing?"

An Engaging Speaker

Noyes was in frequent demand as a speaker before Rotary, Kiwanis, and other civic clubs, Civic Leagues, Women's Clubs, and others. Because of his own free-ranging interests, and his habit of informing himself on all sorts of topics and problems that interested him, he prepared himself to speak authoritatively and entertainingly on many social, economic, and philosophical problems of the day, as well as on certain phases of the history of our institutions. In addition, he made frequent appearances before audiences of teachers for the more technical discussion of educational problems. "To be on my feet with something worth while to say to people, and to get their comeback, that's my idea of a good time."

Historical Background

Before proceeding to the next stage in the career of William Noyes it seems necessary to review certain developments which were taking place in the preparation of teachers of "manual training."

Courses in woodwork and drafting appeared in the offerings of teacher-training institutions before 1890, but one of the earliest organized programs for the preparation of special teachers of manual training for secondary schools was that offered in the fall of 1893 at Teachers College, New York, under the direction of Charles A. Bennett, who moved to Peoria, Ill., in 1897. One year earlier, in 1892, under the direction of Joseph C. Park, a curriculum leading to a special drawing and manual training certificate was offered at the State Normal School, Oswego, N. Y.

At the turn of the century Teachers College, New York, was the foremost institution in the United States for the preparation of teachers of "manual training." In fact, no other institution offered serious competition until, in 1903, The Stout Institute, Menomonie, Wis., began to offer courses for prospective teachers of industrial arts and homemaking, under the leadership of Dr. Lorenzo D. Harvey, followed by Bradley Polytechnic Institute (now Bradley University), Peoria, Ill., where similar courses were first offered in the summer session of 1904, under the leadership of Charles A. Bennett. In 1903, Kansas State Manual Training Normal School, now Kansas State Teachers College, was opened at Pittsburg, and by 1905 a three-year curriculum leading to a certificate was in effect.

A number of other important departments for the preparation of industrial-arts teachers were established during the first decade of the century, but no other institution achieved the national recognition and prestige, at least until after World War I, that was shared by the three schools mentioned, namely, Teachers College, New York, The Stout Institute, Menomonie, Wis., and Bradley Polytechnic Institute, Peoria, Ill.

Change of Emphasis

Beginning soon after 1910 significant changes took place at Teachers College. First, there was a notable increase in the number of experienced teachers and administrators enrolling for graduate study. Second, there was a notable increase, in nearly all sections of the United States, in the number of colleges, universities, and teachers colleges engaged in the preparation of teachers of all grades, as well as a notable improvement in the facilities available. As the prestige and professional value of a higher degree earned at Teachers College increased, the superior-

ity of the undergraduate program, when compared with those of other institutions, became somewhat less apparent.

Observing the trend over a period of years, Teachers College seemed to be forced by the logic of events to abandon its undergraduate curricula, and to become a postgraduate institution. This decision involved the elimination of the work upon which Noyes had been engaged for more than ten years, and he left Teachers College in 1915.

In the fall of 1915, Noyes went to Duluth, Minn., as supervisor of industrial arts, where he organized the department and, in addition, was assigned the task of reorganizing the junior high school. Before the year was completed his health broke and he was obliged to resign. After several months of rest, and complete recovery, he was appointed to the staff of the Federal Board for Vocational Education, and assigned to soldier rehabilitation work in New York City.

In 1921, he moved to Albany, N. Y., where he was employed in the New York State Department of Education, Division of Rehabilitation. This position he held at the time of his death, July 8, 1928.

Photographer

For more than 20 years Noyes was an ardent student of photography. It was much more than a hobby with him; at times it was almost an obsession. His interest in the subject began when friends presented him with a camera on the eve of his departure for Japan, in 1888. He brought back some excellent photographs, but after his return to America he was obliged by circumstances to give up an active interest.

Shortly after he began his new work at Teachers College, in 1905 or 1906, he acquired a new and better camera, and took up photography in earnest. He used photography to keep permanent records of his students' creations in shops and drafting rooms, and at the same time a pictorial record of unfolding events in his young son's early years. "At this time Clarence White was teaching photography at Teachers College, and under his inspiration he became intent on making not merely a photograph, a record, but a work of art."

His characteristic thoroughness and disposition to get to the bottom of things, reinforced by a highly artistic temperament, made him an apt student. Much spare time was spent in experimenting, in reading the technical literature of the subject, attending exhibitions, and cultivating the acquaintance of expert photographers. "During his seven years in Albany he succeeded in depicting a rare beauty in Albany's doorways, public buildings, and streets." Many of his prints were in great demand, and are still treasured by collectors. Exhibitions of his work have been held in the Library Rotunda in Albany, and at the Women's Club, and in New York City at exhibitions held by the Pictorial Photographers of America. The New York State Department of Education purchased as a memorial to William Noyes a collection of 25 of his photographs taken in Albany, finished in platinum.

Conclusion

One more aspect of Noyes's many-sided personality remains to be mentioned. In an earlier paragraph I referred to his membership in the Adirondack Club, and this suggests his interest in outdoor life. While the home was in Leonia the Catskills were within reach. "Through the Catskills he and Anna tramped often with Leonard, four years old, and again at seven through the Adirondacks, many times, through all the mountainous regions of northern New Jersey — in fact, there were no mountains within reach that they did not climb together."

Of that last summer, 1928, it is recorded that Leonard had just completed his first year in the Engineering College at Cornell, was employed in the shops of the General Electric Company, at Schenectady, and was living with his Dad in Albany. Mrs. Noyes was traveling in Europe, her first vacation from her family in 23 years.

On a sultry Sunday in July, Leonard and his Dad motored out an hour's run from Albany, hoping to find relief from the heat in the cool mountain air. They climbed Indian Ladder, in the Helderbergs. The elder Noyes had just exposed a film, when he complained of a pain in his chest. Leonard rushed him home in the car; friendly neighbors came in; a physician was called, who announced that all would be well by morning; but the end came quietly during the night. Miocarditis was the doctor's pronouncement.

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Vocational Education in Greece

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The Siritanidios Public School is located in the small town of Callithea which is about midway between Piraeus (the main seaport of Greece) and Athens (the capital). It is easily reached from either city by a ten-minute ride on the subway. The school was visited by the writer on May 28, 1949.

This school is four stories high and covers an area of about two city blocks. It is open to boys who wish to learn a trade. The ages range from about 8 to 18 years. These boys come from all parts of Greece.

Upon entering the school, the first person that I met who spoke a little English was the janitor. I did not know who he was and he did not know what I wanted. At the first opportunity, I wandered away from him and being unable to ask directions (my Greek is not so good), I kept walking until I found an office and there I was fortunate to find the director's secretary who spoke English. She introduced me to the director, Mr. Eliadis. She acted as an interpreter as he did not speak English.

The school building is made of cement, marble, and stone. It was built by the

The Siritanidios Public School at Callithea, Greece

students in 1929. Note the camouflaged appearance.

The director and the interpreter conducted me through the school. At first I was shown a large classroom. It contained four ceiling lights, four walls, and nothing else. The Greek Communists had removed almost all of the school's equipment when they retreated to the hills. Next I was shown the electrical shop. Here I saw several electrical students repairing electric motors that were sent from near-by factories to be repaired. They showed me some armatures and stators that were made at the school. Due to my skeptical look he showed me the special jigs and dies that were needed to make each individual part that goes to make up an electric motor. Yes, electric motors (real ones) were manufactured at this school. There were many places where large switchboards, generators, motors, and the like were missing. These were taken by the Communists for their own use and to retard advancement.

Next to the electrical shop was the machine shop. The machinery and layout looked very much like a school shop that one would expect to find in the United States. However, there was one difference: the lathes, drill presses, shapers, etc., were made at the school by the students. The castings had the school's letters right on them.

Adjacent to the machine shop was the automobile shop. It would not be hard to guess what the students were doing here. The students were very busy assembling much needed buses. This same shop assembled airplanes during the early stages of the war. The bus parts were prefabricated in Canada and purchased and shipped by E. C. A. to Greece. I saw about ten such buses in various stages of construction. It was very interesting to see how they took shape from the first two pieces of metal being riveted together to the finished, freshly painted bus. Some of the students had just entered the school, while others had been graduated and came back as paid employees to assist on the job and as aids to the teachers. Mr. Eliadis is shown standing beside a bus that is ready to be placed into service.

The shipping crates that were used to send supplies to the school were carefully opened. Each board and nail was saved. These same rough boards were transformed into practical and sturdy drafting tables and workbenches in the carpenter shop. Some of the boys in this shop, as in the auto shop, were returned graduates. All the workmanship seemed to be of the highest quality. These boys were very proud of their work.

On the second floor were the classrooms. We entered a classroom where a lesson in drawing geometric figures was in progress. Immediately the entire class arose from their seats. They always do this when the director or visitors are present. The room was well ventilated and naturally illuminated by the large windows. The walls were painted light. The seating arrangement and general facilities seemed adequate. I inspected a student's work sheet

Mr. Eliadis, director of the Siritanidios School

Americans are well liked in Greece and it was no trouble at all to have the students pose for this and other shots

upon which were several geometric figures such as a septagon, circles, and a line which was divided into several equal parts. Their work was neatly done and looked very accurate to me. The blackboard was full of writing and instructions about the lesson. I was unable to determine how well the blackboard was used or how the lesson was presented because it was in Greek. The situation did not permit me to observe a lesson while it was in progress. I visited three classrooms and the instructors, the director, and myself had a little meeting right in the corridor. I then showed them several lesson plan formats as we use them in the New York City school system and asked them what kind of plan they use. The result was that I had to explain to them (via the interpreter) just what each step meant and how we do it in the States. They seemed very interested. They do not use a plan when presenting a lesson. From what I learned they don't have such things as *recall, motivation, drill,* etc. The academic or related teachers are college men but have no pedagogical training. The shop teachers are men who work in industry and come to the school a few hours each day to instruct in their respective shops.

In Greece there is a close connection between the church and the government. Religion plays an important part in the schools. Right next to a classroom was a chapel which was elaborately decorated. The ceilings and walls were hand painted with intricate designs which were very colorful. There were several small, painted wooden carvings of biblical characters and a few pieces of altar furniture, sturdily built, and well carved. There were many hand painted pictures hung on the wall. The chapel and all its contents were made by students of the school.

As we descended the white marble stairs, I saw two statues of the brothers who gave their fortunes to construct the school. Upon close inspection, I saw the marks of pistol bullets, done by the guerillas in endeavoring to deface them. These statues, too, were made by the students.

The director showed me numerous works of art made by the students. The following photographs were shown to me: marble statues, marble carvings of ancient Greek designs, intricate designs and patterns made of hammered metal, leather upholstered wood chairs, tables, bedroom suites, single family dwellings, farm houses.

These pictures are official school photographs and are on exhibit in a case in the director's office. Such products could easily cause a dispute between the school and labor organizations. However, this school and labor unions have never had any disagreements due to the fact that a member of the school administration is also the head of the trade unions. That overcame the greatest drawback to *live* jobs. There is plenty of realistic training going on here. It is primarily due to the fact that there is a civil war raging in Greece, material is very scarce, and there are few industrial organizations and factories. Little or no equipment or supplies can be spared for education. The result is that the school is run like a factory. It is a factory turning out two basic items — trained boys and finished products.

By examining the accompanying photographs it can be seen how the building has taken the war. Notice the machine gun marks and holes in the walls, rainspouts broken, and roof tiling missing.

I was greatly impressed with the active, realistic program. Training here is good (it could be greatly improved) but there is just one thing that is pathetic — this is the only school of its kind in Greece.

The school shows the ravages of war

Where a school has a good system of placement and follow-up . . . the best measurement of the efficiency of the teacher will be found in the performance records of the students whom he has trained.

This would be a much better way to measure his efficiency than to rate him on superficial items which are only remotely related to the job which he is expected to do. If a large percentage of those trained by an individual teacher make good on their jobs and recognize that the training which they received has helped toward success in their chosen vocation, it constitutes rather conclusive evidence that the teacher is doing a good job.

In view of the basic differences between the qualifications of vocational and academic teachers, it is obviously unfair and incorrect to rate vocational teachers by the same standards that apply to the rating of academic teachers. — *Vocational Education in the Years Ahead,* U. S. Office of Education.

The Industrial Arts Awards Fair sponsored by the Ford Motor Co., for the school year 1949–50, brought out 2,400 entries from 39 states and Hawaii.

Next year's Fair will, undoubtedly, be still greater.

The Voorlezer and His House

JOHN M. HURLEY
Acting Director of Industrial Arts in Elementary and Junior High Schools
Brooklyn, N. Y.

A recent assignment to Staten Island for the purpose of making a shop survey of thirty scattered schools located on this historically important old borough, was the indirect means of unearthing many historical facts about the Voorlezer House which it was my pleasure to examine closely through the courtesy of the caretaker.

> Some buildings are distinguished from the moment they are finished, and the future may destroy them only at great loss. Some buildings achieve importance by withstanding the assaults of time and so gaining values that they did not have while in company with many of their kind. Other buildings have greatness thrust upon them by acts of man that create hallowed association. . . . These are part of our inheritance from three centuries past, and they come down the years to us bearing messages. To recognize and understand such buildings is our birthright, and to protect them is our duty. It can be our achievement, having added to the inheritance, to pass it on. — *Laurence Vail Coleman.*

This is the story of the oldest known elementary school building in the United States. Built before 1696, it stands in Richmond, Staten Island N. Y., and came into the possession of the Staten Island Historical Society in 1939, as a gift from an interested member whose ancestor, James Hanse Dye, first leased the property to the Dutch Congregation on March 6, 1696.

This building is located on the west side of the Arthur Kill Road at its junction with Center Street and is within sight of the Museum of the Staten Island Historical Society.

The Voorlezer's House, Richmond, Staten Island, N. Y.

Rich in Colonial and Revolutionary tradition, it is called the "Voorlezer's House," for as such it was first referred to in a deed written July 17, 1696 — "beginning at a Flat Rock below the Voorlezer's House." Voorlezer (or Forelezer, Vorleezer, etc.) was the name given to a layman chosen by the Dutch Congregation to teach school and conduct church services. This position usually occurred in communities which were unable to obtain or support a minister.

The Voorlezer's House is an example of the economy of the early Dutch settlers who designed this building to fulfill three functions — that of school, church, and residence for the Voorlezer. An interesting evidence of this is found in the original lease: "Ye sd land shall be inhabited by no other as by ye person that serves ye sd congregation" also "and ye sd James Fetcheth children shall have free schoelling if ye sd person shall teach both English and Dutch."

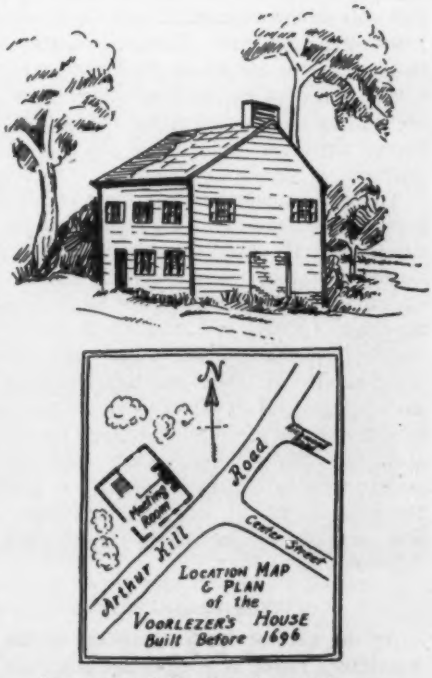
As a church, the Voorlezer's House was the earliest of which there is definite known record upon Staten Island. The French Church, located upon the Belleville Patent only a mile south upon the Arthur Kill Road, was erected about 1698. This building unfortunately is no longer standing and its exact site has been lost. The Church of Saint Andrew, known as the English Church, was built 1709–12, and part of the original walls were incorporated in the present building.

By 1705 the Voorlezer's property had come into the possession of John Androvette who sold it in that year to Rene Rezeau. From that time until 1872 it remained in the Rezeau and Van Pelt families. Since that date it has passed through three sales and one mortgage foreclosure before returning to the hands of the descendant of the original owner.

The Voorlezer's House is now the oldest relic of a once thriving and beautiful village. In 1729 the court house at Stony Brook was abandoned and a new one set up at Richmond. The County Gaol had been located there since 1709. The natural valley situated in the center of Staten Island at the head of navigation on the Fresh Kills was the logical place for the county seat. By the time of the Revolution Richmond had become the most important village in all of Staten Island. Cuckoldstown Inn and DuBois Tavern were rendezvous for the sporting and the wealthy. Near-by tide and fresh water grist mills turned industriously. The tanyard stood at the bank of the creek below St. Andrew's Church. The rolling fields of the valley were farmed by the English, Dutch, and French yeomanry who still owned large tracts of land and employed slaves to help them in the fields and about the household.

During the Revolution this scene was greatly changed. The British troops occupied all of Staten Island and built on the hill above the little village a large fort and many redoubts overlooking the valley. The officers took over the dwelling for their quarters and some came to stay in the Voorlezer's House. Local tradition tells that the occupants of the house were rebels and that the men of the family were forced to take their antiloyalist sympathies elsewhere until the end of the war. Those of the family who remained were kept virtual prisoners by the enemy and were forced to cook for them and wait upon them.

One of the family, Susannah Van Pelt, a young woman at the time, later told of an interesting, though sad, occurrence.



Location of the Voorlezer's house

In the summer of 1776, there were quartered in Richmond one company of British regulars, one of Hessians and one of Skinner's Tory militia. They occasionally made foraging trips into the neighboring rebel territories of New Jersey and in turn were subject to attacks from the patriots.

Quartered at the Voorlezer's House, the home of the Van Pelts, was a Hessian drummer named Ernst who through no fault of his own had been sent by a mercenary prince to fight against those on Staten Island, who were more akin to him than those whose cause he served. Ernst and the littlest Van Pelt, nicknamed "Pretty," became deeply attached to each other. Early in the fall of that year she fell ill and her health became steadily worse. One night, as Ernst sat by the child's bedside, he voiced the strange presentiment that the child would soon die and that he would be buried with her.

It was near dawn when an alarm gun sounded and Ernst rushed out to join his company in fighting off the Americans who were making a surprise attack upon the town. During the battle little "Pretty" passed away and when with the coming of daylight the fighting subsided, the unhappy family found their friend, Ernst, dead by the roadside. Gently their bodies were borne to the family graveyard just a short distance away and there were laid, side by side.

In 1826 John A. Van Pelt came to rest in this same little cemetery which lies just across the street from the Staten Island Historical Museum. His son, Cavalier Van Pelt, his widow Susannah, and Cavalier's little niece and ward, Harriet Wheatley, lived on in the old house. Richmond continued to occupy an important place in the political and social life of the island until shortly after the beginning of the present century.

Today Richmond presents the aspect of an early Colonial town which lies quietly dreaming of its once happy days of importance. The Voorlezer's House, the 3rd Courthouse, the Old County Clerk's and Surrogates Office built in 1848 (now the Staten Island Historical Museum), the Treasure House, the Church of St. Andrew, the Van Pelt Burial Plot all serve to remind the historian and the layman that here lay a village whose buildings bore the record of the manners and customs of the Dutch, English, and French who first settled in Staten Island three hundred years ago.

The House

As the earliest known mention of the Voorlezer's House is in 1696 and since the date of the Rider Patent, on which the house stands, is 1680, it is assumed that the house was erected during the intervening period.

The house is a two-story frame, clapboard building, which rises 2 ft. higher in the front than in the rear. This makes the roof have an unequal pitch and the gable ends are to the side. The building measures 25 ft. across the front along the Old Kings Highway, now Arthur Kill Road, and 28 ft. in depth. The methods of construction are interesting embodiments of seventeenth and eighteenth-century features and ones not seen in building construction today.

The foundation walls are 2 ft. thick and are of rough undressed fieldstone laid up in mud for mortar. Successive coats of whitewash protected these walls from the weather. Crudely though clearly cut into one of these wall stones are the letters I R and the date 1769, carved there by Jacob Rezeau, an early owner.

On these foundation walls, timbers were laid for sills and into these the vertical posts were notched or mortised and tenoned, as the method is called. All timbers are oak or whitewood and were cut from the near-by forests. Hewn to the desired size with the broadax, the timbers were matched together into the framework of the house while lying on the ground. When all was completed, the men of the congregation and neighbors raised the framework into the places prepared for it upon the foundation walls.

Floor beams were in turn fitted into the vertical posts and over all the roof rafters were raised, their lower ends resting on the roof plate and their upper ends mortised and tenoned. All joints were securely fastened by driving in each a wooden peg or treenail (trennel).

The spaces between all vertical posts measure generally 4 ft. Into these spaces, after leaving openings for doors and windows, the old builders fastened horizontal sticks or laths and pressed mud about them which, when dry, made a solid wall 4½ in. thick. Clapboards were finally nailed to the outside and long 3-ft. shingles were similarly fastened to the oak furring strips on the roof.

At the northeast end of the house is built a massive stone and brick chimney. In the cellar the chimney work is entirely stone with the exception of the brick oven. This oven opens directly into the huge fireplace in the seventeenth-century fashion. The large oak lintel which spans the fireplace supports much of the brickwork above. There are three fireplaces above the cellar, two on the first floor and one on the second. These are simple yet their plain whitewashed surfaces, devoid of panelwork or shelf surrounding the seventeenth-century arched openings speak most vividly of the times and the people who built and gathered about them. On one of these is scratched the initials S. V. P. (Susan Van Pelt).

The huge fireplace and oven in the cellar indicate that here the Voorlezer's family did their cooking and baking. As this cellar-kitchen is only a few feet above the water line of the Fresh Kills Meadows, on whose edge the house is built, the floor is often damp. It is probable then that the fireplace in the little room directly above did its share of the cooking. A partition long since removed, once divided the cellar into two rooms, and a door closed up at the south end, gave access to the outside.

Originally it is thought each floor was reached by a steep straight staircase more like a ladder. About the year 1800 these were removed and the present interesting staircases with landings were constructed in their places.

The first floor was for many years divided into two rooms; a small one partitioned off in the northwest corner by a mud-filled wall on one side and a vertical board partition on the side separating it from the remaining room. This small room, mentioned above, was used by the Voorlezer for general living purposes. In the large room, it is supposed, services were held. When the staircase was built a partition was constructed forming of this room a smaller one and a hallway.

Until about 1825 the construction of the second floor was similar to the first. The small room was used as a bed chamber and it contains no fireplace. The large room which contains a fireplace and has an extra set of floor beams for reinforcement, is probably the schoolroom. This room, about 1825, was divided into two small rooms and a hallway.

The garret is a fascinating place, for here discernible among the shadows and the cobwebs, is the unaltered handiwork in hewn beam and rafter of the old builders. The battened door at the head of the stairs has an HL and an H wrought iron hinge and a wooden latch with string.

The floor beams were exposed from below on both the first and second floors. Those in the first floor ceiling are planed and finely edge-beaded while those of the schoolroom above are rough smoothed with the broadax. No paint of any kind was applied to the beams or any of the other woodwork until about 1800 when alterations were first made. Mud filled walls, however, as well as the fireplaces, were whitewashed.

Floors are laid with wide boards of white pine measuring from 14 to 16 in. in width.

These are worn uneven by the tread of countless feet. Windows and doors, while not original, are of the same low and wide proportion as their forerunners.

History turns back over 200 years when you enter the Voorlezer's House. The simple and sturdy life of the times is reflected in the low beamed meeting and schoolrooms with their whitewashed walls and fireplaces. As one of our oldest houses, as our first known church and school on Staten Island, and as the oldest known elementary school building surviving in this country, the Voorlezer's House may well become a symbol of the spiritual, the temporal, and the social forces which molded together the peoples, not only on Staten Island but of the nation.

Plan Now For '51 Industrial-Arts Fair

J. ELY VAN HART
Industrial Arts Supervisor
Elizabeth, N. J.

The 1950 Industrial Arts Awards Fair in the Chicago Museum of Science and Industry was a most impressive educational activity. There were approximately 3000 entries of students enrolled in industrial-education programs of the private and public schools of our country. The Ford Motor Company, in sponsoring the industrial arts awards, is encouraging finer craftsmanship and design and is recognizing and awarding the achievements of youth.

Would it not be possible for 25,000 secondary students to be represented? Surely all industrial-arts teachers and those in the vocational field who are teaching in the areas represented in the program have at least one student whose work merits being sent in for national competition.

After selecting the projects and filling out and attaching entry blanks, the teacher has the responsibility of packing and shipping or delivering them to the place of judging. From that time until the projects are returned to the schools, the staff of the Ford Motor Company carries on.

Both large and small projects can be sent by Railway Express. None can be sent by parcel post because of the written information on the entry blanks.

The manager of the local office of the Railway Express Agency is always ready and anxious to assist with any shipping problems. He will be glad to furnish the necessary shipping tags. It is more economical for all schools in a city to ship in one consignment with one shipper listed, although the consignment may include many individual packages.

Each agency has its own table of rates. Each shipment carries a minimum insurance of fifty dollars plus fifty cents for each pound over one hundred pounds. Additional insurance may be procured at eleven cents per hundred dollars valuation. Approximate costs are:

	1000 miles	*500 miles*	*100 miles*
10 lb.	$1.75	$1.40	$1.20
24 lb.	2.50	2.00	1.60
50 lb.	4.25	3.00	2.25
100 lb.	7.50	5.00	3.50

The cost of all shipments over one hundred pounds is based upon the per pound cost of the one hundred pound rate.

The problem of getting the projects to the place of judging has been raised by some school people. This should not be serious. Many prize winning entries are small and could be shipped prepaid at a very nominal expense. There are many ways in which the instructor may meet the problem of shipping expenses. However, no matter what procedure is followed

Three winning entries in furniture making

From left to right: Platform rocking chair, Maurice Mogo, Teachers College Junior High School, Fitchburg, Mass.; breakfront secretary desk, Charles Rice, Woodruff High School, Peoria, Ill.; candlestand, Roger Fillebrown, Teachers College Junior High School, Fitchburg, Mass.

Prize-winning pattern was made by Robert Giefer, St. Paul Vocational School, St. Paul, Minn.

Judges are (left to right): J. Ely Van Hart, supervisor of industrial arts, Board of Education, Elizabeth, N. J.; Thomas Diamond, formerly at University of Michigan; and H. A. Sotzin, head of industrial arts, San Jose State Teachers College, San Jose, Calif.

the approval of the principal and superintendent should first be obtained.

1. In some cases it might be possible for the superintendent to make arrangements for paying the shipping charges from the regular school budget.
2. Many schools have their own individual accounts from which such expenses could be paid.
3. Parent Teacher Associations are often sufficiently interested to sponsor such a project.
4. In cases where students can afford it, they might pay their own expressage.
5. The local Ford, Mercury, or Lincoln dealer, or any interested neighborhood store, might be glad to co-operate by having an exhibit in his show room and by paying the shipping costs.
6. Kiwanis, Rotary, Lions, and other service clubs are usually glad to assist in various community activities.
7. It might be practical to select a small but interesting article and make a number, using factory production methods. The money received from the sale of these articles, after deducting for materials could be used to cover the shipping expenses.

Judges in the wood division

From left to right: James J. Hammond, director of industrial arts, State Teachers College, Fitchburg, Mass.; Frank C. Moore, past president of the American Vocational Association, and director of Industrial Arts, Cleveland, Ohio; and O. S. Harrison, head of industrial arts, University of Georgia, Athens, Ga.

The Industrial Arts Awards Program deserves the support of every industrial arts and vocational education teacher. For detailed information contact *Industrial Arts Awards, Ford Motor Company, 3000 Schafer Road, Dearborn, Mich.*

Cold Typography— Commercial or Shop Subject

R. RANDOLPH KARCH
University of Pittsburgh
Pittsburgh, Pa.

What school department should teach the operation of *cold type* office composing machines? Does this new, fast-growing activity belong in the regular typing class of the high school commercial department, or is it the province of the graphic arts laboratory? Is it *typing* or is it *typography?*

Cold type was given impetus by the demands of the last war for quick, inexpensive, and confidential printing. Millions of instructional sheets, machine catalogs, office forms, booklets, and even large books were produced without benefit of printing from hot-cast type and slugs. These *special typewriters* and *office composing machines* are now not only producing at least 75 daily and weekly newspapers, but more and more office forms, catalogs, and even series of textbooks of over 500 pages each are being so produced.

Because of the rather haphazard training afforded operators of these machines, users are already looking to the public schools for well-qualified operators. When the schools meet this demand, where will the operators be taught?

How Cold Type Machines Produce Printing

The various cold type machines produce what a printer would call a *reproduction proof*, one print on a sheet of white paper of words, paragraphs, and minor headings. This reproduction proof is then photographed, producing a negative. After retouching, the negative is used to make an image on an offset-lithography plate, from which printing is accomplished on offset-office duplicators or on standard lithographers' offset presses.

Vari-Typer font

Four cold type machines are now in use: the *Vari-Typer*, of which some 20,000 are in use; the *DSJ Coxhead Composing Machine*, of which almost 2000 are now producing copy; the *IBM Electric Typewriter*, numbering in the thousands; and the *Justowriter*, now being sold for the first time.

The Vari-Typer

The feature of the Vari-Typer which makes it a composing machine, over and

above its use as a typewriter, is its ability to produce type in sizes of 6, 8, 10, 12, and 18 point. Type fonts, about the size of your crooked index finger, are removable from the machine, and can be changed from one size to another in a matter of seconds. English fonts number about 132, and over 400 foreign language faces are available. Special fonts of characters like those used in tariff work, and mathematical and astronomical printing also are available. Justification, the aligning of the right-hand margin, is accomplished automatically by the machine on the second keyboarding of the copy. Letters have one width, set-wise.

The DSJ Coxhead Composing Machine

The DSJ Composing Machine, made by the manufacturers of the Vari-Typer, produces more type-like characters than does the sister machine. *DSJ* means *differential space justifier*. Differential space means

The DSJ Coxhead composing machine has interchangeable type

that letters are of one of three widths, set-wise: the small *i* is two units wide, the small *n* is three units wide, and the small *m* is four units wide. Point sizes run in 6, 7, 8, 9, 10, and 12 points. About 36 designs of type are made in these sizes. Justification is accomplished in the same manner as on the Vari-Typer.

The IBM Electric Typewriter

The IBM Electric Typewriter has a keyboard touch similar to that of the Linotype

The IBM electric typewriter has light touch, character widths based on four units

machine, actuated in the same manner with cams confronting a rotating rubber roller. It is quick and easy to operate. Having the same 84-key keyboard of the standard typewriter, it of necessity has only one style of type, although it has been announced that changeable type bars will soon be available. Letters are based on four unit widths, and the result is quite type-like. Justification is accomplished by keyboarding the entire page at one time, then counting the spaces left at the ends of lines, and adding or subtracting spaces in the second keyboarding. Justification is not automatic as on the Vari-Typer and DSJ Composing Machine.

The Justowriter

The Justowriter consists of two machines, one called the Recorder, which operates like a regular typewriter. As the copy is

The recorder unit of the Justowriter perforates the actuating tape for the reproducer unit

keyboarded, a paper ribbon is punched in code. This ribbon is then run through the second machine, called the Reproducer, which operates automatically without an operator, and justifies each line. The outstanding advantage of the Justowriter is that only one keyboarding is necessary to

The reproducer unit of the Justowriter operates automatically, and justifies lines from actuating tape

align the right-hand margin. Like the IBM, only one type face is available, and only one size. Another advantage is that the letters are based on a five-unit scheme, allowing characters which are more type-like than any other machine.

Costs of the Machines

The Standard Vari-Typer, for four sizes of type, costs about $8.50. The DSJ Coxhead Composing Machine costs $1,950. The IBM is about $550. The two Justowriter machines cost $4,750. By comparison, Mergenthaler Linotype Machines and Intertype Machines, which produce hot-cast type lines, cost from about $5,000 to $12,000.

Speed of Operation

It is generally conceded that on ten point type, an operator of Linotype and Intertype machines produce about 3000 ems per hour. (An em is the square of the type body of any size.) Operators on Vari-Types and DSJ's average about 2200 ems per hour — including the *two* keyboardings. Unjustified matter is, therefore, at a rate of about 4400 ems per hour. IBM machines are about 10 per cent faster than Vari-Types and DSJ's. The speed of the Justowriter is about that of the IBM — but, it is to be remembered, only one keyboarding is required.

What Must Cold Type Machine Operators Know?

Because cold type machines look like typewriters and have a standard typewriter keyboard, most of the operators *graduated* from typist to type composition operators. However, the transfer of training is only in the actual manipulation of the keyboard. There exists no transfer of training in typography, because typists have no typographical training, as such. Graduated typists now operating cold type machines carry over many unwanted and unneeded *skills* not required for type reproduction proof making. For example, a typist, being used to single, double, or triple spacing, and lines about seven inches long, will blithely keyboard a line of six point (the smallest size usually used!) and set it *solid* (no space between lines) on an office cold type machine! This results in unreadable copy — the poorest of typography. She will carry through her overlearned skills of using two hyphens for an em dash, although the em dash appears on the cold type machine. She will ignore ligatures (tied-together fi, ff, etc.) because her typewriter does not have them. She has no knowledge of the elements of typographic display, harmony, appropriateness, or the niceties of printing which set it apart from mimeographing from typewritten stencils.

Please compare the printing on this side of the page with the printing on the right hand side. Do you like to read one better than the other? Or do you think there is no important difference? Tell me your choice by checking the form below. Also please ask your husband about this and check his choice in the space provided. Please return this letter to me with yours and your husband's choice indicated on it.

Please compare the printing on this side of the page with the printing on the left hand side. Do you like to read one better than the other? Or do you think there is no important difference? Tell me your choice by checking the form below. Also please ask your husband about this and check his choice in the space provided. Please return this letter to me with yours and your husband's choice indicated on it.

Material set in hot and cold type

Use the Justowriter to compose your office forms, directions, price lists, reports, parts lists, bulletins, graphs, charts, production forms, statements, data sheets, engineering word drawings . . . wherever type composition is required. Use it actual size, reduced or enlarged.

Yes, we can design — *lay out* — the work for the operator of the cold type machine, similarly to the manner in which such work is laid out or designed for the Linotype operator. But, there being no substitute for graphic arts brains, seldom do we find an office manager who is also a typographer. He must depend upon his operator to lay out the work. He has no time or interest in such pursuits.

Familiarity with a keyboard is one of the least attributes of a cold type operator. It is easier to teach a young man or young woman the touch system than it is to teach them typographical know-how. Our vocational and even some of our industrial-arts printing departments have Linotype and Intertype hot-metal machines, and teach their operation only in the last years of the course of study, *after* typographical principles are learned. The touch system of the keyboard and the mechanics of the machine are easily learned *after* one has mastered the needed typographical principles of printing design.

What Cold Type Operators Should Know

Most of the important graphic know-how is outlined as follows. This information and skill are required of those who expect to be successful as operators of cold type machines.

1. Type face recognition.
2. Selection of appropriate type faces for the job and for the process.
3. How to make layouts (typographic design) for: (*a*) books and booklets, (*b*) office forms, (*c*) advertising literature, (*d*) tariffs:
4. Methods of typographic display: (*a*) traditional display (centered lines), (*b*) off-center balance, (*c*) copy fitting, (*d*) use of color.
5. Other type composition methods: (*a*) hand composition, (*b*) Linotype and Intertype, (*c*) Monotype, (*d*) Ludlow Typograph, (*e*) cold type devices other than the machine at hand.
6. How to use the cold type machine: (*a*) the point system of measurement, (*b*) type fonts, families, series, sizes, (*c*) spacing of paragraph matter and display, (*d*) use of borders and rules, (*e*) indentions (squared, hanging, half-diamond, poetry), (*f*) corrective letter spacing of capital letters, (*g*) use of leaders (dotted lines), (*h*) use of initial letters, (*i*) use of *paper-pad* type for sizes larger than available on cold type machine at hand.
7. How to paste up reproduction proofs: (*a*) use of T square, drawing board, and triangle, (*b*) how to use an ink ruling pen.
8. How to proofread.
9. How to prepare artwork: cropping, figuring for reductions or enlargements, how to order negatives, photostats, plates.
10. How to understand and use paper.
11. How to do or order bindery work.

This machine is particularly well adapted to text composition for books, magazines, newspapers and printed products where the bulk of the composition can consist of text set in one face only. Where no reduction in the size of type is to be made photographically, the automatic typing may be done directly on an aluminum or paper offset plate or on any duplicating matter.

An example of IBM electric typewriter type, similar in appearance to the Bookman type on hot-type machines.

Keyboarding Rough Copy

Printing and lithography are the handmaids of business. Without them, business as now conducted would cease to function. They are largely responsible for the increase in wealth. A machine is invented in a given locality and a new branch of industry is created. The facts about it are printed and distributed in other localities, goods are sold, and employment is created.

Keyboarding Justified Copy

Printing and lithography are the handmaids of business. Without them, business as now conducted would cease to function. They are largely responsible for the increase in wealth. A machine is invented in a given locality and a new branch of industry is created. The facts about it are printed and distributed in other localities, goods are sold, and employment is created.

How lines are "justified" (aligning of right-hand margin) on the DSJ: rough line is keyboarded as at left. Tab key is struck. Line is rekeyboarded as at right, and extra space is placed evenly between words. On Justowriter this is automatic without second typing. On IBM, spacing is noted and figured by operator

Cold Typography Is a Shop Subject

The list of knowledges and skills listed indicate the need of a curriculum outside the realm of the usual typing class in the commercial curriculum of high school. This list, in up-to-date and functional graphic-arts courses, already exists in the course of studies in our high schools and vocational schools.

The use of cold type machines depends upon these skills and knowledges. As they are already taught in the graphic-arts department, it is sensible to place cold type devices in the shop rather than in the commercial department.

How closely cold type compares with hot type is shown in the sample at the top of page 18. Can you tell immediately which is hot and which is cold?

Justowriter's Centaur design, designed by Bruce Rogers, is more type-like because five units of space determine letter widths. Left: Intertype Garamond Bold; right: DSJ cold Garamond Bold.

Basic Style Name	*On the Coxhead DSJ*
1. Oldstyle	Garamond 620
	Garamond Bold 680
	Garamond Bold Italic 685
2. Modern	Bodoni Book 600
	Bodoni Book Italic 605
3. Sans Serif	Sans Serif Medium 660
	Sans Serif Bold 670
	Sans Serif Bold Italic 675
4. Square Serif	Alexandria Light 650
5. Newspaper	Tribune News 610
	News Bold 640
	Bookman 630

Type faces available on the D.S.J.

Instant interchangeability of type faces on the DSJ give an opportunity for various styles not possible on other cold type machines.

Here are the Sizes of Most DSJ Styles

This line is set in 6 point on the Coxhead DSJ

This line is set in 7 point on the Coxhead DSJ

This line is set in 8 point on the Coxhead

This line is set in 9 point on the DSJ

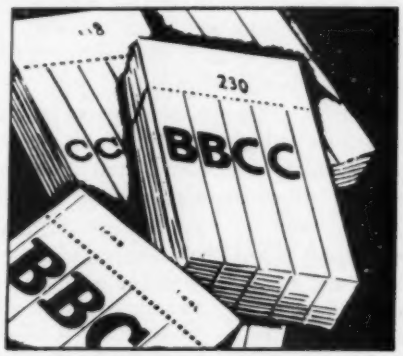
This line is set in 10 point on DSJ

This line is set in 12 point DSJ

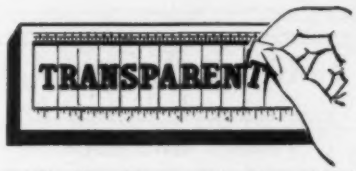
D.S.J. sizes

Different sizes of type are available on the DSJ machine. Changes from 6 to 12 point are made in a matter of seconds. IBM and Justowriter, to get varying sizes, must resort to photographic reductions or enlargements.

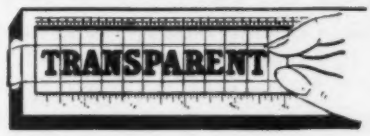
A DSJ font of type is about the size of your crooked finger. It contains 90 characters. Other cold type devices have 84 characters, and cannot change to different fonts.



Pads of "Paper Type" in Large Sizes for Pasting Up Headlines



Large Headline Characters Are Assembled In a Special Composing Device from Pads



Scotch Tape Holds the Characters Together

Headlines Are Pasted with Small Cold Type

Vocational Facts You Should Know

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Facts, as you may or may not know, are actualities, certainties, and practical experience as distinguished from imagination, speculation, and theory. Therefore, judgments and decisions, based upon *facts*, are logically very reliable. These vocational facts can be of great value to you in the study and selection of any vocation. Read and study carefully the following facts to guide you in the choice of a vocation. Remember these are facts, not just controversial or unreliable sentences or thoughts.

Desire to Follow a Certain Vocation: Fact 1 — Success and failure both are influenced strongly by possessing or lacking this desire. However, this desire should respect other requirements of equal and greater importance.

Strong Will Power and Determination: Fact 2 — This attribute is as necessary in the carrying through of your plans, despite disappointments, hardships and handicaps, as such plans are difficult and trying. Success depends upon this courage and strength, while failure prospers in its absence.

Specialized Training: Fact 3 — Practically all classes of work today require, in addition to the regular academic curricula, a special scholastic and manual or trade training course to pursue the vocations that offer attractive financial returns.

Not Limited to Just One Vocation: Fact

(Continued on page 43)

Industrial Arts and Vocational Education

John J. Metz, *Editor*

PEACE ON EARTH — 1950 STYLE

The Christmas season is almost upon us. It is supposed to be a period of joy and happiness. Looking at world events, however, makes one wonder how anyone can be joyful and happy under present conditions.

The boys at the front, cold under murky skies, with insufficient protection against the inclemency of the weather, opposed by dreadfully superior numbers of half barbaric enemies, surely see nothing to be happy about. Their parents, relatives, and acquaintances, also see little about which they can feel happy.

Probably the only ones who can gloat are those who set this new slaughter of human beings in motion. They can be happy for two reasons — they have our men on the run, and they can gleefully assert that they are succeeding in blotting democracy and religion from this earth.

Unfortunately, our leaders at Washington have not acted wisely at all times. Their defections must now be paid for with blood and money. They are learning by the hard way that you can gain little by associating with people to whom religion, honesty, and fair play mean little.

The saddest part of the whole mess is that our entire governmental household has been infested with men and women who hold allegiance to the Kremlin rather than to our own country. Even now when our communist enemies are on the verge of triumphing over us, these men seem to take delight in delaying everything that might help our country in straightening out its internal affairs.

It seems that, to many of our political leaders, the price in thousands of lives of our own American boys is not too great to pay if they can but gain a political advantage. With almost childlike simplicity, governmental secrets for the defense of our country have seemingly been allowed to get into the hands of our enemies. Then if the guilty parties are pointed out, those that do the accusing are derided and calumniated. It may be said that, if it had not been for these anti-American activities, by people in high places, much of our present troubles could have been avoided.

Conditions are so bad at present that it would seem all of us would recognize that our puny human efforts are insufficient to battle the forces that are trying to drive religion out of this world. It is time for all of us to look at our own spiritual lives. Washington was not ashamed to get down on his knees before his armies and pray for help from above. Let us imitate him. Let us, too, pray for help to drive communism out of our country, and to establish peace, real peace that is not the result of appeasement, and a peace for all the inhabitants of the world.

CONVENTIONS IN GENERAL

The A.V.A. Convention at Miami, Fla., which was held November 27 to December 2, demonstrated that our profession ought to hold more conventions that would benefit all members found within its ranks.

The Miami convention was well attended, considering that the convention city was located so far from the center of the school life of our country. As was to be expected, it was well attended by the top ranking members of the industrial arts and vocational education group. Teachers, however, were there only in very small numbers. It would be well, however, if the schoolroom teacher could avail himself of the opportunity afforded by these national conventions to a greater extent.

As it is at present, there is little chance that he will be able to do this. School authorities would not be willing to release the shop teacher for several days to attend a national convention far away from his home. Even if they were willing to release the teachers, they would not willingly assume the cost of such convention attendance. Most teachers, even if they got permission to attend would be unable to bear the expense themselves because their salaries, even though increased to some extent as they have been, are woefully low compared to the increased costs of the present day.

This particular problem needs a great deal of study, and the A.V.A. resolutions committee recommended that a committee be appointed to study it. It might be wise to have regional conventions, patterned after the annual Four State Industrial Arts and Vocational Education Conference held at the Kansas State Teachers College, Pittsburg, Kans. Probably the same program could be used at each of these regional conferences. At any rate, the cumulative attendance of shop teachers at such conferences could be expected to be much greater than at any one national convention.

It is a thought worth considering. And by all means let's have the industrial-arts convention at the same time that the vocational education group meets. The teachers of these two subjects should meet to consider their common problems much more often than they do.

And while we are at it, let's have more demonstration sessions such as the one held by the industrial-arts section on Friday morning at the Miami convention.

4-H CLUBS

A little over a year ago, a sixteen-year-old farmer lad, John Clive Williams, won a Westinghouse scholarship award as one of six national winners in the 4-H "Better Methods Electrical Contest," sponsored by the Westinghouse Educational Foundation.

This lad, putting into practice what he had learned at his 4-H meetings, built an automatic machine for dusting and counting 30,000 gladioli bulbs each year. This job which previously took 24 hours, can now be completed in three and one-half hours.

With an electrical hotplate, a lard can, and a metal cover he made an efficient chicken brooder.

He rewired his father's home and barn.

He won 19 prize ribbons for registered dairy cattle that he raised.

He applied modern cultivation techniques thereby increasing the corn-crop yield on his father's farm.

His 4-H club may be justly proud of him.

The teachers of agriculture have developed the 4-H clubs in a wonderful manner. It would be well if their methods and techniques were more closely scrutinized and more generally applied in other than agricultural subjects.

PROBLEMS AND PROJECTS

PROJECT MANUAL FOR SPUN BOWL

EMERSON WILLIAM MANZER
State Teachers College
Platteville, Wis.

The spun bowl described in this article is a companion piece to the two candlesticks described on pages 402 to 405 in the December, 1950, issue. Since the project does not call for very much intricate spinning it will be possible for a boy in the senior high school industrial-arts classes to make this job.

The manual gives specific directions for constructing the required chucks, making the follow block, making the base, and for spinning the project.

Reference readings are given to supplement the information the student may have or to enlighten him further in the growing art of metal spinning in the school shop.

Any wood lathe of standard size will suffice for occasional spinning providing there is a spinning rest and a ball-bearing center available. There are a number of good spinning lathes on the market and since metal spinning lends itself to the production of many kinds of projects, every school shop should be equipped with a good spinning lathe.

Section One: Materials — Supplies — Equipment

MATERIALS REQUIRED

1. *Wood*

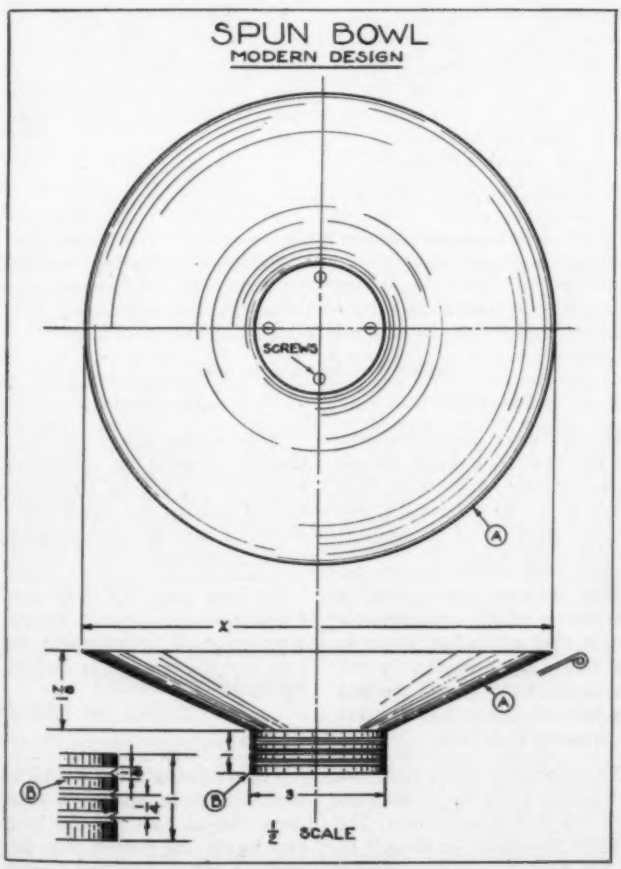
No. of pcs.	*Name of part*	*Material*	*Size*
1	F — Chuck	Maple, walnut, tulip, or other wood. NOTE: If bowl is to be a companion piece to the candlestick shown on page 402 of the December, 1950, issue, use the same kind of wood used for the candlestick.	2 x 10¼ x 10¼
1	C — Follow block	Pine or other wood	1 x 3 x 3

2. *Metal*

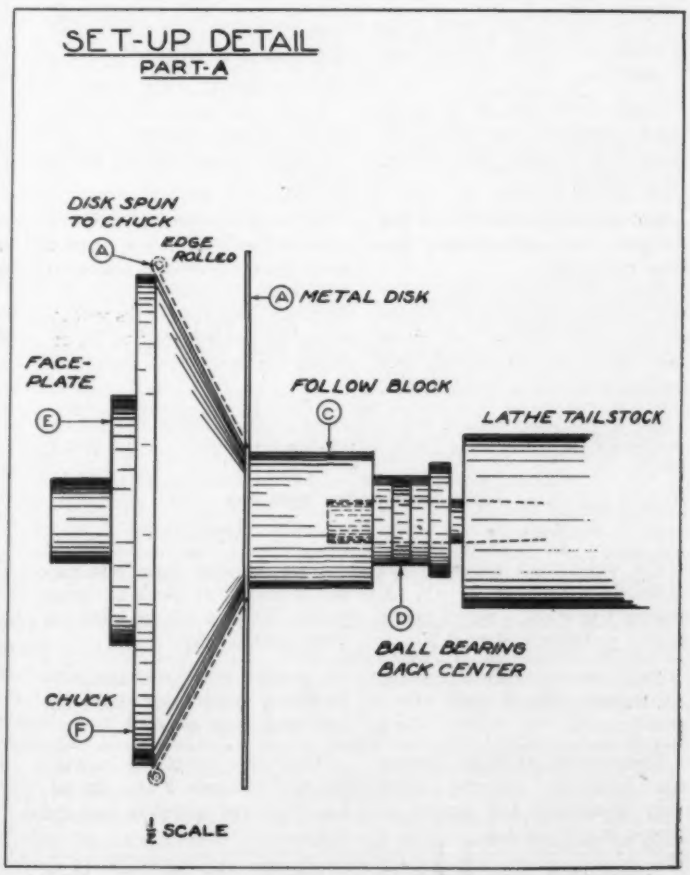
1 Metal Disk, No. 18-ga. spinning copper, or 16-ga. aluminum, or 16-ga. pewter, 11 in. in diameter, if lathe will swing this diameter. If not, use largest disk that lathe will accommodate.

SUPPLIES REQUIRED

1. Garnet paper — ½ sheet No. 6/0; ½ sheet No. 1; ½ sheet No. 0.
2. Steel wool — Small bunch of fine No. 5/0 if possible.
3. Abrasive cloth — ½ sheet No. 321 Aloxite.
4. Screws — Four No. 8 by ½-in. r.h. Use screws to match the metal used for the bowl.



Details of spun bowl



Set-up for spinning bowl

5. Lacquer — ¼ pint, clear for metal and wood.
6. Thinner — ¼ pint (lacquer thinner).
7. Brush — 1-in. fine hair for lacquer work. If possible spray the lacquer on the work.

EQUIPMENT REQUIRED

1. *Tools*

Screw driver to fit slots of No. 8 screws; drills for screws; 6-in. outside calipers; 6-in. dividers; rule; wood-turning tools; spinning tool; ball-bearing back center; spinning tool rest; center punch.

2. *Machines*

Wood lathe; band saw; buffer; drill press or hand drill; spray gun if available.

Section Two: Making the Spinning Chuck

Directions	*Key Points*
Cut wood for chuck . . . 1 by 10¼ by 10¼ in. Glue two pieces this size. Draw diagonal lines from corner to corner to find center. Use a pair of dividers to scribe a 10-in. circle.	Glue one piece across the grain of the other. If shop has a planer, plane a piece of wood long enough to make the two reqtiired pieces. Use maple or birch.
Band saw to scribed circle on glued block.	Set band saw guard about ½ in. above the wood block. Start saw into cross grain of wood.
Center block on faceplate. Use good size screws to fasten plate to block. Mark position of screw holes.	Bore fastening holes in the block for each screw. Use drill slightly smaller than screw shank. Soap or wax each screw so that it will enter wood easily.
Turn block on lathe to largest diameter possible. Cut face of block so that it will taper to a diameter of 2⅜ in. for the base of the bowl.	Sharpen lathe tools before doing any turning. Sharp tools are always necessary for good turning, especially birch or maple.
Sand well to remove all rough spots, especially the end grain. Keep face of chuck flat. Do not round edges.	A smooth surface is required for all spinning chucks. Use garnet paper. Do all cutting before sanding.
Do *not* remove chuck from the faceplate until all spinning has been completed. NOTE: If the shop has a tap with the same number of threads as the lathe spindle, the chuck may be bored and tapped. This method does not tie up faceplates.	Mark the faceplate, if used, with a center punch directly opposite a mark punched on the chuck. If the chuck is removed from the faceplate these two marks will indicate the correct position for repacing the faceplate on the chuck.

References: Information and Operation Units, *Machine Woodworking*, Smith (Wichita, Kans.: McCormick-Mathers Pub. Co.), pp. 29–35, 63–71.

Section Three: Making Wood Base

Directions	*Key Points*
Cut wood from glue-up stock 1 in. thick and 3¼ by 3¼ in. square. Use wood to match candle holder in Project Manual No. 1.	Draw diagonal lines from corner to corner of block to locate center. Scribe a 3¼-in. circle on block with divider.
Band saw to scribed line. Do not undercut line.	Set band saw guard about ½ in. above wood block. Start cut into cross grain of wood.
Fasten a circular block to proper size faceplate, centering block very accurately. Use screws of proper length and size.	Block may be placed between the face of chuck F and the follow block and turned to size and shape.
Turn circular block to 3 in. in diameter and cut *V* using point of sharp skew chisel.	Measure the required ¼-in. spaces and then cut *V* to a depth of ⅛ in.
Sand base carefully. Do not round the V corners.	After sanding do not finger print the finished work.
If faceplate has been used do not remove it from work until all finishing has been done.	Sanding, after lacquering, may be done on the lathe.

References: Information and Operation Units, Machine Woodworking, Smith (Wichita, Kans.: The McCormick-Mathers Publishing Co.), pp. 24–25, 9–11.

Section Four: Making the Follow Block

Directions	*Key Points*
Cut wood for follow block 3 by 3 in. square and not less than 1 in. thick. Find center of block and punch with center punch.	Thickness of block must not vary. Both sides must be parallel. Select solid wood. Pine will be satisfactory.
Scribe circle on block 3 in. in diameter. Band saw to circular line.	Set band saw guard ½ in. above the wood block.
Bore hole in center of block 21/32 in. in diameter ½ in. deep. If this size drill is not available, use ⅝-in. Foerstner bit. Use drill press and check drill press table. It must be at right angles with the drill.	The hole in the follow block should be a little larger than the end of the ball-bearing back center. The follow block must turn freely. Small piece of wax in hole will provide sufficient lubrication.
Place follow block on the end of the ball-bearing back center. Place chuck F on lathe spindle. Run the follow block up against the face of the chuck. Apply enough pressure to the follow block to make it turn with the chuck. Turn the follow block to the 2¾-in. required diameter.	The face of the follow block and the face of the chuck must be parallel. If they do not fit evenly they will not hold the metal disk in place while it is being spun. Do not apply too much pressure on the follow block.
Sand follow block and round edges.	

NOTE: A ball-bearing back center is necessary for all metal spinning and for turning round jobs without centers. Circles of wood for wheels, plastic circles for covers and bases, cork for coasters, soft metal, may be turned to required diameters. The ball-bearing back center multiplies the kind of work that can be done on a lathe.

Section Five: Spinning the Bowl

Directions	*Key Points*
Put chuck for part A on lathe spindle. Put follow block on end of ball-bearing back center. Run follow block up against the face of the chuck. This is done by turning hand wheel.	Turn on lathe power and check the free running of the follow block. If block runs tightly on end of ball-bearing center place a dab of wax in hole of follow block to lubricate it.
Place the metal disk against the face of the chuck, centering the disk as well as possible. Draw up the follow block so that it will not be too tight against the disk but tight enough to hold the disk in place while it turns.	Set lathe speed for 1800 r.p.m. (revolutions per minute). Do not use high speed for a big disk. Be sure that the tailstock is securely tightened.
Place spinning rest in lathe tool rest holder. Have top of rest even with top of tool rest holder. The fulcrum pin should be about 1 in. to the right of the disk. Fasten the spinning tool rest tightly. It must not move.	The directions given are to be used with lathe operator's judgment. Adjust tool rest for your own height and convenience. Experience will be your best teacher in this case as it will in all others.

Directions	*Key Points*
Center the revolving disk, if this is necessary, by touching the disk with the end of a stick of wood ¾ by 2 by 12 in. The stick is held in the left hand, on top of the spinning rest and inside of the fulcrum pin. The stick will be in a horizontal position when it touches the revolving disk. After a few attempts at centering a disk the operator will not have any further trouble. Do not allow anyone to stand in front of a disk while it is being centered.	While the off-center disk is revolving, the follow block is drawn back easily by turning the hand wheel of the tailstock with the right hand. As the pressure of the follow block is released, and the pressure of the stick on the disk increases, the disk will be moved to its center. When the disk revolves accurately, quickly tighten the follow block against the disk. Lock the tailstock spindle.
Place spinning tool or improvised spinning tool . . . 36-in. piece of hardwood or piece of shovel handle with end sanded smoothly, under the armpit of the right arm. Place the tool to the *left* of the fulcrum pin. The left hand holding the tool against the pin. Place the end of the spinning tool against the revolving disk just opposite the base of the chuck. Apply pressure at this point and then gradually move the spinning tool down and to the outer edge of the metal disk. Ease the pressure as the tool reaches the edge of the disk, else it will bend the metal and cause *ripples*. This tool application is repeated until the metal is laid down against the chuck.	Do not try to lay the metal against the chuck with one application of the spinning tool. Lubricate the disk with a piece of yellow laundry soap by touching the revolving disk with the soap. If the disk *ripples* at the outer edge it may be straightened by holding a piece of wood opposite the spinning tool. The stick is held in the left hand and placed under the spinning rest. The thumb of the left hand rests on top of the spinning rest. If the metal has hardened it must be annealed by heating. If annealed it must be cleaned in an acid bath to remove scale. Pewter does not harden like other metals.
When spinning has been completed, remove the spinning rest and clean the metal with fine emery cloth and steel wool. To clean the inside of the metal shell, turn the shell around. Put the follow block against the bottom of the shell . . . inside. Finish the edge of the shell also. Trim the edge if necessary and then roll the edge. See reference for this procedure. An old file, sharpened chisel fashion, will provide a good trimming tool. Hold the trimming tool on top of the spinning rest and apply the tool as the metal shell revolves.	The cleaning of the metal in the manner described will remove any mill marks, scratches, or spinning rings, and will also prepare it for buffing and the final finish. Since holes will be drilled in the base of the bowl it will be necessary to locate the center of the base. Place the bowl on the chuck and hold the bowl on the chuck with a piece of steel wool. As the bowl revolves, apply a piece of fine emery cloth to the base, starting from the center and moving to the outer edge. This will show the exact center of the bowl. Mark lightly with center punch.
Using the center mark on the bottom of the base, scribe a circle and locate the four screw holes. Drill holes the diameter of the screw shank.	Mark location of holes with a center punch.

NOTE: A spinning rest is necessary for all spinning. Without a spinning rest, and its fulcrum pin, it would be impossible to get the required pressure against the revolving disk of metal.

References: Units in etching, spinning, raising, and tooling metal, Smith (Wichita, Kans.: McCormick-Mathers Publishing Co)., pp. 27–37. *Metal Spinning,* Regan and Smith (Bruce Publishing Co., 400 N. Broadway, Milwaukee, Wis.).

Section Six: Assembly and Finishing of Bowl

Directions	*Key Points*
Buff metal bowl on buffing wheel charged with tripoli to remove all emery cloth or steel wool marks. Finish buffing on another buffing wheel charged with a polishing compound.	After polishing the metal bowl, clean off all polishing compound with a clean cloth. Do not *finger print* the polished bowl. Handle with a clean cloth.
Lacquer the metal bowl with clear lacquer, cut ½ with thinner. If the metal shows varied colors the lacquer is too thin. Use a fine hairbrush or spray the lacquer on the bowl. Let dry in dust free air.	Lacquer for metal should be thin. If too thick it will show brush marks. The final appearance of the job depends much upon the finish.
Lacquer the wood base, let dry and then place work on lathe, slow speed, for sanding with very fine sandpaper. Give second coat of lacquer.	Let dry, free from dust. Do not handle much prior to applying the lacquer.
When both parts are thoroughly dry, place the bowl on the base and mark location for holes on the wood base. Bore holes in wood with a drill smaller than the screws to be used.	Use a screw driver that fits the screw slot when driving the screws in the base. A small dab of wax on the threads will make the screws enter easily.
Assemble the two parts being very careful not to mark the metal or destroy the screw slots.	This spun bowl is a companion piece for the candlestick shown on page 402 of the December, 1950, issue.

NOTE: If aluminum is used for the bowl it may be finished in color providing it can be sent to a firm that does *anodizing.* This is a coloring process that produces the beautiful colors on aluminum ware. Many gift shops will have articles that have been anodized.

Reference: Units in etching, spinning, raising, and tooling metal, Smith (Wichita, Kans.: McCormick-Mathers Pub. Co.), pp. 32–37, 47–48. *Instruction and Information Units for Hand Woodworking,* Douglas-Roberts (Wichita, Kans.: McCormick-Mathers Pub. Co.), pp. 107–108.

PRACTICAL LITHOGRAPHIC DEMONSTRATION

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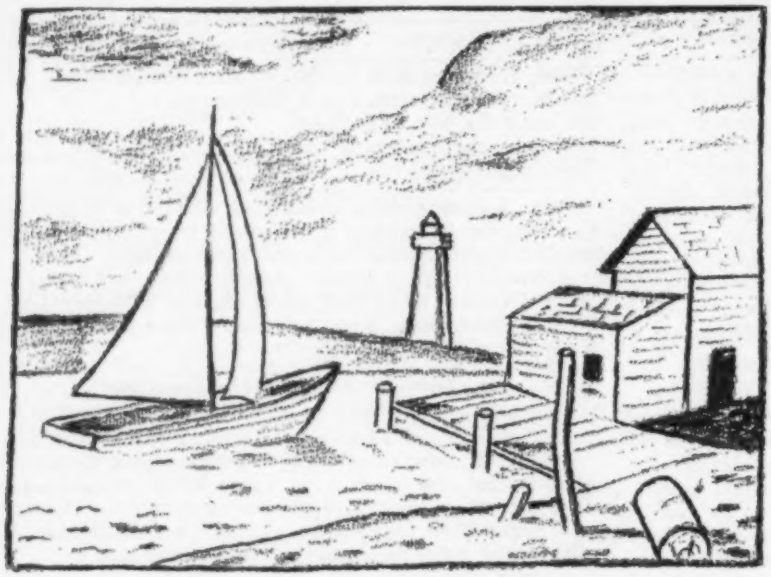
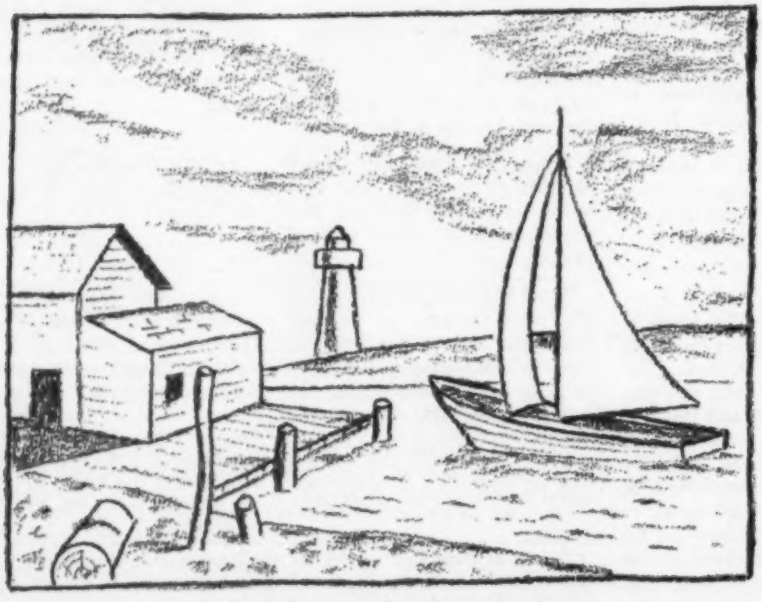
If we are to give our students a comprehensive picture of the graphic arts we must of necessity familiarize them with the three basic methods of printing. Relief or letterpress printing presents no problem at all, being the backbone of the graphic-arts industry and the major area of our school shop. Intaglio or gravure is presented through the use of celluloid etching or through the use of the Swan etching kit. Planographic or lithographic printing was the missing link in this triumvirate. For many years individual instructors were struggling with the problem of demonstrating this process, achieving varying degrees of success.

With the advent of inexpensive multilith plates the problem has become very much simplified. The experiment has been tried with both the Duplimat, which is a paper plate manufactured by the Addressograph-Multigraph Corp., and the Direct Image Plastiplates manufactured by Remington Rand, Inc. It was found that the paper plates, after they are moistened and inked have a tendency to coil up; thereby making the pulling of a proof more difficult. The Plastiplate has more body and therefore is more adaptable for this dem-





Practical lithographic demonstration

onstration. The Plastiplate is grained and extremely sensitive to grease, so much so that if the oil from your hand is transferred to the plate it will appear on the finished print. The grained surface of the plate reacts as a lithographic stone would to a lithographic crayon, the slight grain holding the particles of the greasy crayon.

Drawing Directly on Plate

For original designs the image may be drawn directly on the plate with a lithographic crayon. However, the plate will act as a negative, therefore the illustration and lettering must be drawn in reverse. In drawing directly on the plate, the hand must be protected from touching the sensitive plate; this may be done by placing several sheets of paper between the plate and the hand.

Transferring Design to Plate

Transtrace is a thin sheet of paper coated with yellow wax which will cause an image to reproduce on Direct Image Plastiplates. This tissue is placed over the plate with the greasy side in contact with the grained or printing surface of the plastiplate. The use of this tissue allows for more freedom in drawing because the hand rests on the uncoated side of the transtrace, and the oil in the hand will not come in contact with the printing surface. A mimeograph stylus, a pencil or even a ball point pen may be used in making the tracing and the width of the line will be determined by the technique used in making the tracing. Large dark areas and shading may be added directly to the plate with a lithographic crayon. When the transtrace method of making an image is used, it is possible to first draw the illustration on tracing paper. Then by tracing from the reverse side of the tracing paper the image will print like the original drawing.

Etching the Plate

The etching process simply involves the washing of the lithographic plate with either of the following two mediums. Plastetch, the recommended medium may be used, although through experimentation it was found that tap water is a satisfactory etch. However, plastetch may also be used as a cleansing medium.

Printing the Plate

A lithographic print may be made on the proof press, although it will be necessary to build a type high base on which to place the plate for printing. The reverse side of an old mounted printing plate will do. While the plate is still damp, place it on an old piece of newspaper, and ink it with the proof press brayer. After much experimentation with job, half tone, bond, and multilith ink it was evident that job and half-tone ink could not produce a satisfactory print because the inks did not have a sufficient affinity for the greasy image. Contrary to all lithographic principles, it was discovered that bond ink will make as good a print as could be made with multilith ink, and that coated or calendered stock will give a better print than if antique stock is used.

Suggested Use

Lithography is the most direct of all graphic arts, for in drawing the image the pupil can see the exact value of each line that he draws and then his drawing is reproduced so accurately, that it may be said that his drawing has been multiplied. Whereas in linoleum cutting and celluloid etching a proof is necessary to determine the value of each line.

Projects in this medium may be used in very much the same way as linoleum and celluloid etching projects. Here the pupil creates his own design and carries the project through to completion, the final print may be mounted and framed. Lithography is identified by clear sharp fine lines which are a soft even color, the technique is well within the ability of junior high school students and will open to them another avenue of creative expression.

Sources of Material: Remington Rand, Inc., Bridgeport 1, Conn.: Remington Rand Direct Image Plastiplate, No. 651. Box of 100, 10 by 15-in. plates — $18. Plastetch, No. 381, per quart $1.85. Transtrace, No. 488, folder of 12 sheets, 40 cents. Lithographic crayon may be purchased in any art supply store.

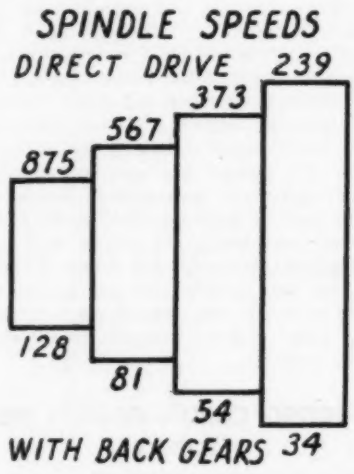
A nation increases or declines in strength; it never remains still. Our future depends upon our industrial progress, or lack of it. Our industrial progress depends upon the skilled hands and minds of our workers.

— *W. F. Patterson.*

METAL LATHE SPINDLE SPEED CHART

LEO A. MAY
Machine Shop Instructor
High School
Steubenville, Ohio

In teaching machine shop to high school students, I have found it helpful to use a chart that will show the proper spindle speeds for drilling and turning mild steel on the lathe. The chart and diagram shown in this article is for a 13-in. South Bend lathe. This chart can be attached to the headstock cover of the lathe and will then be readily accessible when needed.



If a student is turning 1-in. cold rolled steel, he would find the closest proper spindle speed is 373 r.p.m. He then would find 373 on the cone pulley diagram and place the machine belt in a similar position on the lathe. Chart also shows the proper spindle speeds when using carbon drills for drilling mild steel.

This spindle speed chart will eliminate the necessity of calculating the spindle speeds for various diameters of work.

SPEEDS FOR STEEL

Turning Dia. of Work	*Speed*	*Drilling Dia. of Drill*
1/16– 7/16	875	1/16– 3/16
1/2– 15/16	567	13/64–25/64
1 –1 1/2	373	7/8–35/64
1 9/16–2	239	9/16–3/4
2 1/16–3	128	49/64–1

SEGMENTED FRUIT BOWL

DONALD L. DETWILER
Instructor in Woodworking
LLOYD B. KEHLER
Instructor in Drafting
PAUL W. MEMMERT
Vocational Director
Technical High School
Bethlehem, Pa.

Construction steps required for the making of the segmented fruit bowl:

1. Rip the strips from which the segments are to be cut. Material sizes may vary; suggested sizes are shown on the drawing.

2. Set the circular saw to a 22½-deg. angle and cut all segments to the desired lengths.

3. Sand the segments so that the ends are perfectly true.

4. Glue segments together, two at a time, using the rubbing method.

5. Glue segments together four at a time, using the rubbing method. NOTE: Four segments form a half circle.

6. Sand each half circle of segments in order to form a perfect straight angle and then apply glue and rub each half together to form a completed circle of segments with perfect joints.

7. Sand *one* face of each segment ring smooth and true on a disk sander.

8. Attach lathe faceplate to the faceplate ring and glue the solid bottom ring of the bowl to the faceplate ring.

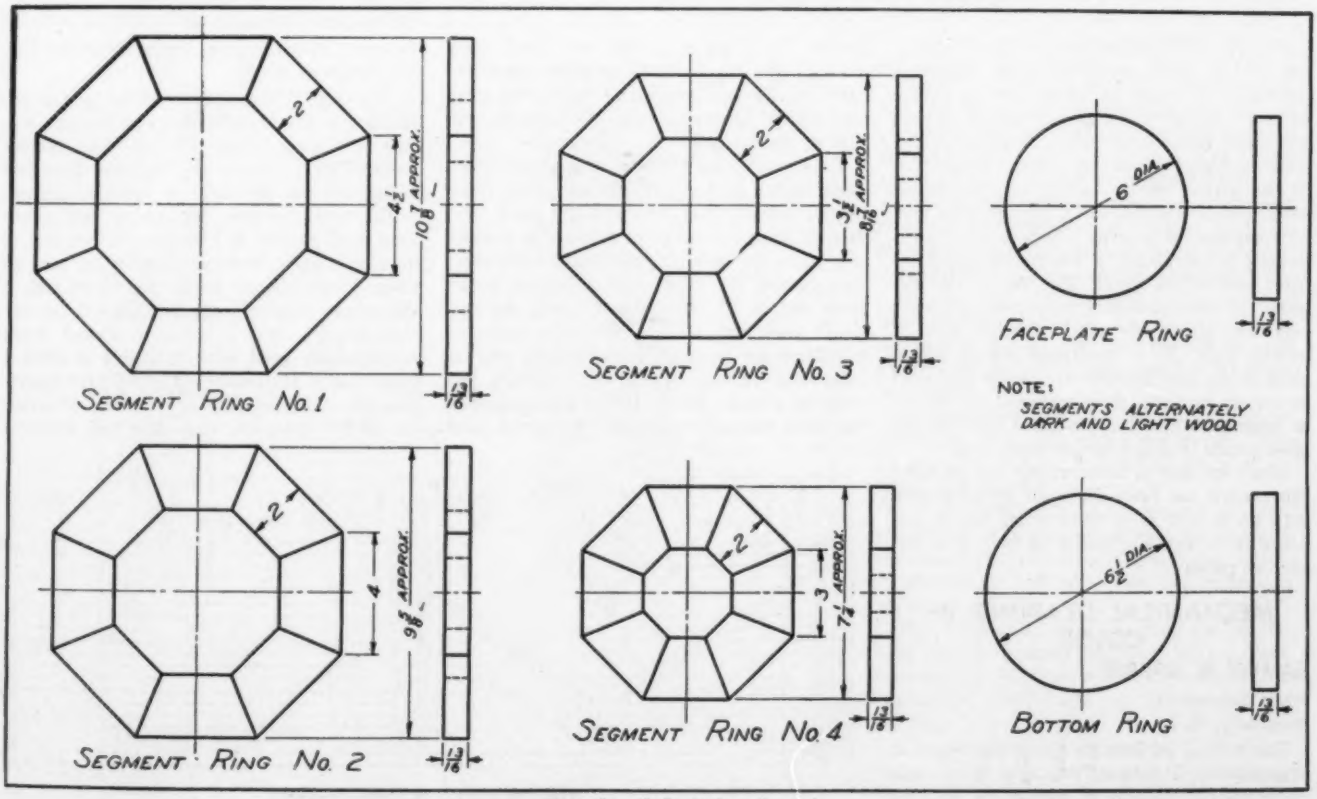
9. Glue the smallest segmented ring to the solid bottom ring of the bowl, and after the glue is set, turn the top of this ring true.

10. Glue the next sized segmented ring on top of the first ring, taking care to break or offset all the joints.

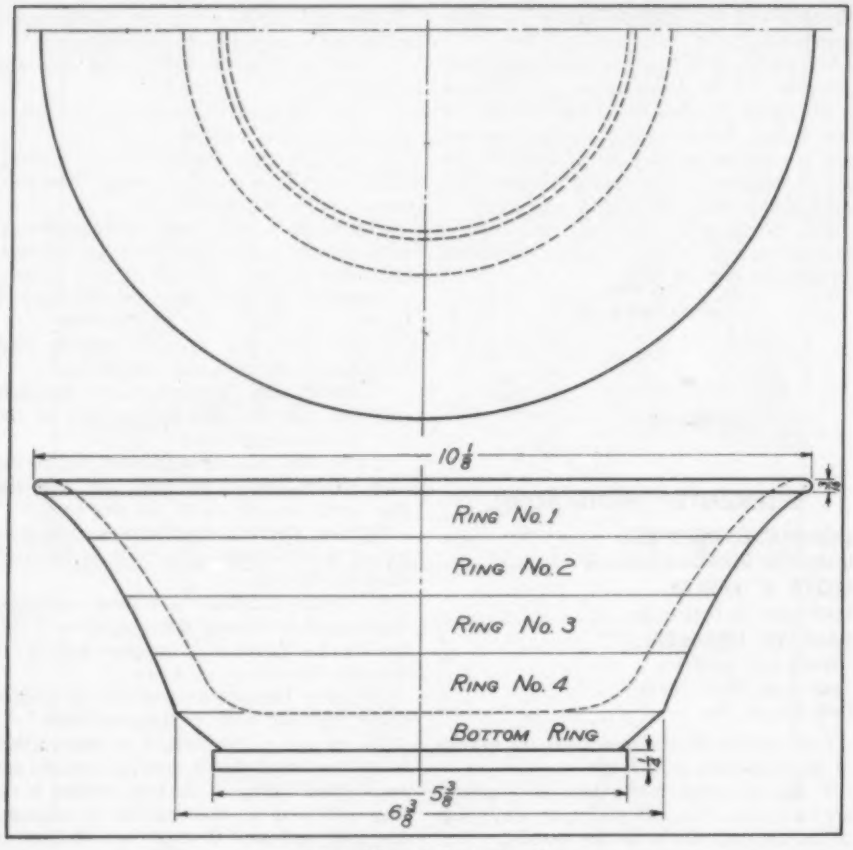
11. Continue gluing the various segmented rings together, turning the tops of each ring true, until sufficient rings are glued together to form the blank bowl as shown.

12. After turning the bowl to the desired shape, sand and finish to your own taste.

By the use of this method of construction, it will be found that it does not require any troublesome fitting of the last segment in the ring, providing an even number of segments are used, such as 6–8–10–12, etc. The use of



Details of fruit bowl



Assembly of fruit bowl

pinch dogs is eliminated entirely. The construction of this bowl, according to the suggested procedure, is within the range and the ability of the average ninth-grade student. There are many educational values included in the construction of this project, from the selection of the desired woods to the beautiful finish of the completed bowl. Each segment ring may be composed of various woods so that after turning is completed, a fascinating design in wood will be the result. The cost of the materials of construction is very nominal; however, the sales price of the finished bowl is usually high. In a vocational school where mass production methods are taught and used on certain projects, these segments can be cut in large quantities and processed into the finished article in a surprisingly short time.

Much interest in constructing and finishing this project has been displayed by all grades, 9 to 12, as well as by the evening school students. It is really a useful as well as a distinctive project.

MECHANICAL DRAWING IN COLOR

SAMUEL R. BARBER
High School
Westerly, R. I.

The writer, an industrial-arts instructor at Westerly High School, Westerly, R. I., has made use of colors in his mechanical drawing classes for some time. He feels that using colors helps the students visualize the views more clearly and understand their work more thoroughly. He makes use of colors in isometric, oblique, and section drawings.

He started using colors on a progress record chart of his students' work, employing three colors: green, blue, and red. If green predominated in the student's marks, the student was up in his work, progress was satisfactory, and passing the course and receiving credit were certain. If blue predominated, the student's work was average, the color indicated a chance for personal improvement, and in classwork, passing was to be expected, but with an average mark. If red predominated, the work was below average. There was need of definite improvement, and a mark of failure or incomplete was quite probable.

Having successfully made use of colors on the progress-rating chart, the writer adapted the basic colors: green, blue, and red to the students' drawings — red for top view, blue for front view, and green for the side or end view. After these colors were accepted, he added yellow for inside surfaces and purple for slants and curved surfaces.

I have used this color scheme for the past three years and find it helps the student visualize his drawings, and breaks the monotony of lines and surfaces for the beginning student. It also gives him a goal to achieve, as his privilege of using colors depends upon his work — accuracy and neatness being very important factors. It has been noted, that tenth graders will strive for successful work to gain the right to use colors. The eleventh and twelfth graders have asked for, and have been granted permission to work out their own color schemes as long as they present a chart. The interest has been such that the school department has purchased colored inks to be used in more advanced work. At the present time crayons are used in tenth-grade orthographic, isometric, and oblique drawings.

It has been observed that this experience in using color stimulates the students to check each other's ability to employ their various colors correctly.

RECORD CARD — WHAT I DID TODAY

JOHN MONROE SCHOOLER
Handicraft Teacher
Florence Nightingale Junior High School
Los Angeles, Calif.

The card, What I Did Today, is mimeographed or printed with dates or without, but they are much more effective with printed dates. Then there are no *forgotten* dates and failure to use the card is quickly noticed.

The cards for one class are carried in my shop coat pocket. If I find a student loafing or disturbing or working contrary to instructions, I pull out the cards, flip to his and in the proper column make a mark (U for unsatisfactory) or if I notice a student doing exceptionally good work or acting to help, I mark that in the proper column (R for recommended). This requires only seconds. It makes the record complete with date and indicates

WHAT I DID TODAY

NO. DATE 1950	WORKED	HELPED	NAME / HOME ROOM / GRADE / SHOP / PERIOD / SEMESTER
11-6			
11-7			
11-8			
11-9			
11-10			
11-11			
11-12			
11-13			
11-14			
11-15			
11-16			
11-17			
11-18			
11-19			
11-20			
11-21			
11-22			
11-23			
11-24			

NO. DATE 1950	WORK	HELP	NAME / HOME ROOM / GRADE / SHOP / PERIOD / SEMESTER
11-27			
11-28			
11-29			
11-30			
12-1-50			
12-4			
12-5			
12-6			
12-7			
12-8			
12-11			
12-12			
12-13			
12-14			
12-15			
12-18			
12-19			
12-20			
12-21			

The "What I Did Today" card

his work habits and his degree of co-operation.

At clean-up time each boy gets his card and writes with his own hand what he did that period. There is plenty of space. For example, in metal shop, he could write "hammer-marked, bottomed, trimmed, fluted bowl." There is plenty of space on one line to write what he did.

As the cards are passed back to me during clean-up time I notice to see that the statement is reasonable and sensible and logical or it must be done over. It is impossible for a boy to do much cheating on his statement. His actual work must agree with his card.

This recording method has been invaluable to me and some other teachers who have used them.

The cards are great work producers. Boys do not like to write their own record "in red."

They also are morale producers. Boys do not like to have those dated records of loafing or misconduct. If they do not see me make the record, they do see it at the end of the period.

These record cards are success builders. A glance at a week old card reveals more to me about a boy's direction than I have ever been able to get before I used the cards. These cards enable me to spot and correct unprofitable tendencies at once.

As a check on my own work, these cards cannot be beat. A glance at a week old card shows poor work by me, or failure to teach, or failure to oversee, or poor organization. Sometimes it is not what I (the student) did but clearly what the teacher failed to do.

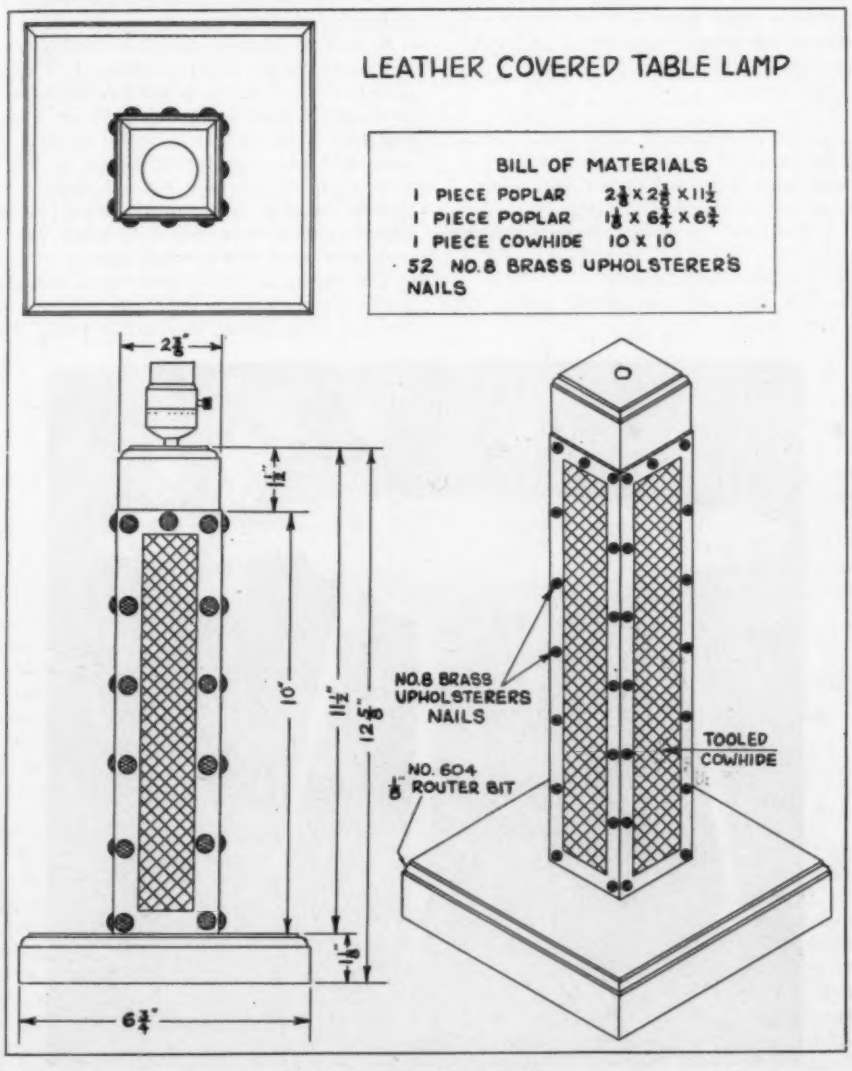
A mature teacher with excellent classes does not need this card but the young teacher with problem students will find it a friend indeed.

LEATHER COVERED TABLE LAMP

GEORGE N. BOLLINGER
Dublin High School
Street, Md.

This table lamp would make a very attractive addition to a den, a playroom, or a study. The center of attraction is the tooled cowhide leather post. A quilted effect is obtained by tooling straight lines to form a pattern of squares which are at 45 degrees to the base. In order to fasten the leather to the wooden post evenly, cut four blocks of wood, ½" by 1⅞" by 10 in. Clamp one of these blocks to each side as the leather is worked around the lamp. The block should be clamped to the center of each side to allow for temporary nailing. Approximately ⅛ in. of leather should be allowed to overlap for skiving and cementing the joint.

The leather in this case is dampened on the smooth side for tooling, after it has been fastened to the post. The wooden base and exposed part of the upright are stained mahogany to contrast with the cream-colored cowhide. A square-tapered shade in maroon is recommended.



Leather covered table lamp

VOCATIONAL REQUIREMENTS FOR BEGINNING OFFICE JOBS

KERMIT CRAWLEY
Member of Vocational Requirements Committee
Stephens College
Columbia, Mo.

Significant data that grew out of the National Office Management Survey as conducted by the Vocational Requirements Committee, discloses the following:

As the size of the office increases, proficiency requirements stated for beginning jobs become lower.

Over half of the companies do not have a program of in-service training.

Over half of the companies do not give formal tests to applicants.

Ninety per cent say they have job specifications for beginning stenographers.

About half of the companies require a physical examination. (Apparent good health seems to be the accepted standard.)

Among eight mental traits listed, spelling, grammar, and accuracy are listed as being the most important. General knowledge, adaptability, intelligence, and memory rank high.

Stenographers are expected to type from 40 to 60 words per minute. Twelve per cent require only 40, 60 per cent require 50, and 26 per cent require a typing speed of 60 words per minute.

Stenographers are expected to take dictation from 70 to 100 words per minute. Only 29 per cent require a speed higher than 90 words per minute.

On the evidence at hand we can say that the present standard in most offices is 45 words per minute in typewriting, 80 words per minute in shorthand, and 30 words per minute in transcription.

The committee, after studying the results, feels that the present standards have a direct relationship to classroom instruction, office production, availability of employees, and salaries.

The committee has recommended job standards for 1953 and for 1960 with the thought in mind that business teachers will welcome some

specific goals; that office managers and executives will welcome increased production; and that office employees will enjoy added financial security because of their increasing worth to business.

The National Office Management Association, 132 West Chelten Ave., Philadelphia, Pa., has made available to schools and office managers tests to measure the competence of graduates and beginning office workers.

VOCATIONAL TRAINING IN PAINTING

MARK McMILLIN

San Bernardino, Calif.

The new public trade school established in conjunction with the senior high school, San Bernardino, Calif., offers many vocational courses, among them a vocational course in painting. The course, which was prepared by teachers of industrial arts in the high school with the help of a committee of painters chosen from the community, aims to prepare boys and young men to become competent and successful painters.

Upon completion of a certain amount of trade school training, the learner is qualified to enter the trade as an advanced apprentice, and eventually reach the status of journeyman. The regular apprentice reaches the journeyman rating, only after he has served a prescribed number of years at the trade in order to gain the necessary judgment and skill.

The requirements for entrance to this course are relatively simple. Young men between the ages of 16 and 22 are eligible for enrollment, but they must be physically sound and agile, and of average height. Also, they must possess good eyesight, have an aptitude for mechanics and accuracy, and present a neat personal appearance.

As for education, they must have completed at least the tenth grade, but a high school education is considered desirable and a decided future advantage. A background of arithmetic and drawing is also essential.

The training program, designed for apprentices, requires 20 months for completion, at the end of which period, the student is qualified to enter the trade as an advanced apprentice. Many texts and reference books are used in the course, all of which may be secured from the school's technical library.

In order that the training program may serve individuals most effectively, the activities of the course are presented in progressive order. The student begins with the simple jobs, and advances to the more difficult work, on an individual working program, thus permitting unrestricted progress in accordance with individual ability.

If the student has already had previous training or experience in the trade, he is given credit for such skill and knowledge, and his training begins at the point where he has the ability to carry on. In the painting industry, there is only one employment level for the young man who desires to learn a trade, and that is apprenticeship. The line of promotion is journeyman, painter, decorator, foreman, and occasionally contractor.

The objectives set up for the course are:

1. Ability to do definite jobs specified in the various employment levels.
2. Ability to understand the facts and principles that condition the job.
3. Ability to understand and appreciate the industrial relations that affect the job.

The training program for the course in vocational painting and decorating requires twenty months, and includes:

1. The ability to do such definite jobs as:

Prepare new plaster surface for painting.
Prepare new wood surface for painting.
Prepare old plaster surface for painting.
Prepare old paint surface for painting.
Mix various kinds of stains for interior work.
Mix lead and oil paints for first, second, and third coat work.
Apply various kinds of stains, paints, enamels, and varnishes.
Wax and polish wood surfaces.
Set up scaffold and roof jacks.
Mix and apply various kinds of wall finishes.
Operate a spray gun.
Refinish furniture.
Do glaze and blend work.
Design stencils.
Cut stencils.
Paint stencil designs on various surfaces.
Hang wallpaper on ceilings and walls.
Hang panel paper and decorative borders.
Hang sanitas and cloth hangings.

2. The ability to understand facts and principles of:

Color schemes and harmony.
Primary, secondary, and tertiary colors; tints and shades.
Applied psychology of color.
Properties of paint pigments, binders, and vehicles.
Properties of thinners and solvents, varnishes, shellac, and lacquers.
Effect of elements on materials.
Estimating materials required for the job.
Blueprint reading and specification interpretation as applied to painting and decorating.
Proper care of tools and materials.
Safety precaution necessary to preserve self and fellow workmen, and to conserve materials and equipment.
Liquid measurements used for paints and thinners.

3. The ability to understand and appreciate industrial relations, as they apply to and become pertinent to this employment level.

PALETTE TABLE

DONALD IRVING

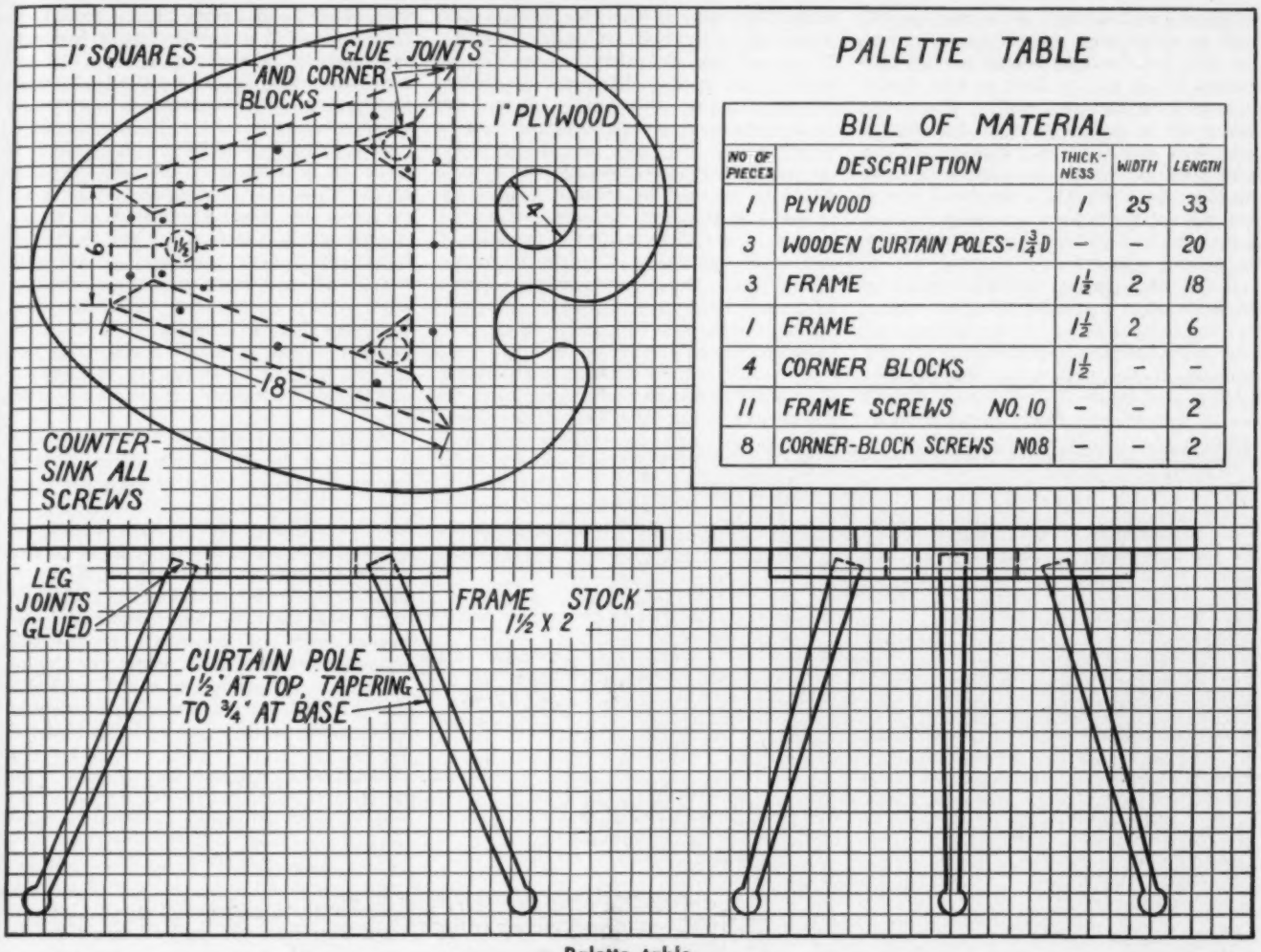
Mt. Vernon, N. Y.

The palette table described in this article is distinctive and attractive.

Begin by making the pattern of the top piece by transposing the illustrated design to a large piece of heavy wrapping paper. Lay the pattern down on the piece of plywood and use a few daubs of rubber cement to hold it securely in place, and then trace the outline on the wood with a pencil. Next saw out the design, including the 4-in. hole; exercise care in this operation to prevent splintered edges. When completed, sand to a fine smoothness.

The frame, of 1½ by 2-in. stock, is made next and glued and screwed to the underside of the top piece. Miter the lengths neatly for

Palette table



PALETTE TABLE

BILL OF MATERIAL

NO OF PIECES	DESCRIPTION	THICK-NESS	WIDTH	LENGTH
1	PLYWOOD	1	25	33
3	WOODEN CURTAIN POLES-1¾ D	—	—	20
3	FRAME	1½	2	18
1	FRAME	1½	2	6
4	CORNER BLOCKS	1½	—	—
11	FRAME SCREWS NO. 10	—	—	2
8	CORNER-BLOCK SCREWS NO.8	—	—	2

Palette table

snug-fitting joints. Round off all sharp edges and corners. The paper pattern can be employed to assist in finding the correct position of the frame on the top piece.

With regard to the joint holes in the wedges to accommodate the legs, remember that they must be drilled at an angle of 40 to 50 deg., and all to the same depth, because the legs splay outward.

Be sure to select any angle that will not extend the bases of the legs beyond the perimeter of the table top. The holes can be drilled before or after the corner blocks are attached, the latter being the wiser course. No. 8 by 2-in. wood screws together with glue are used to fasten the wedges into place.

Wooden curtain poles turned down on a lathe make excellent mahlstick-like legs. The length of the legs in the illustration are 19 in., and the ball tips are 1½ in. in diameter. Use caution in joining the legs to the wedge holes with a dependable glue. Invert the table in this operation and glue one leg at a time, using weights or some similar device to assure a strong joint.

Sandpaper the completed table and then apply several coats of flat white paint and finish with white enamel. Plants, cut flowers, or artificial ones may be placed in a container in the 4-in. hole.

If desired, the design of the table may be altered. A little thought on the subject may suggest changes that can be made without spoiling the design as a whole.

TURNING AND BORING WITH CEMENTED CARBIDE TOOLS

RALPH B. POPKIN

Paso Robles Union High School

Paso Robles, Calif.

Every modern machine shop is equipped for turning and boring with cemented carbide tools. Production shops, jobbing shops, tool and die shops, and experimental laboratories use this modern cutting material for efficient manufacture of products made of almost every workable material. Hence, every student learning the machinist trade should be prepared thoroughly in the use of cemented carbide tools in all its machine tool applications. In the industrial-arts shop which has as one of its objectives the teaching of industrial processes and techniques, the student should become familiar with the same applications.

There is a possible application of cemented carbide tools in virtually every machine tool operation involving cutting, shearing, extruding, swaging, and forming. Turning and boring on the lathe, vertical turret lathe, boring mill, and horizontal boring mill are key operations in the machine shop and basic in the training of the shop student. Therefore, this application of carbide tools should be considered as a primary part of the total school machine shop program.

Preparing the Lathe

In applying carbide tools, the machine and the student must be orientated to the entire process. Therefore the student should be taught to prepare his machine for efficient operation. This preparation is necessary, of course, in all conventional processes. However, the increased speeds and their resulting increased loads required additional precautions. The installation of the machine and all the working parts should be double checked for proper adjustment.

A careful routine check on the machine will result in better work and efficient operation. The lathe bed should be leveled carefully and leveling devices such as shims or bolts should be secured for increased rigidity. The power unit should be checked to insure an adequate and steady supply of motive power. If the lathe is belt driven, the belts and belt lacing should be inspected. The belts should have a good belt dressing applied. If a clutch is in the power unit, it should be adjusted for positive transmission of power.

The working parts of the lathe should be cleaned, oiled, and adjusted. The spindle bearings should be checked. If the bearings are taper roller bearings, they should be adjusted carefully. If the machine has split bushing bearings, the caps should be tightened properly and all the end play should be taken up by adjusting the spindle thrust adjusting nut. The tailstock requires adequate checking. The tailstock locking device should work properly with all parts properly oiled and seated. The tailstock spindle lock should work properly and the taper in the spindle should be clean, smooth, and true.

The saddle and apron should be inspected next. The toolpost T slot should be cleaned carefully so that the tool holding device can be secured firmly. The gibs of the compound rest and the cross slide should be cleaned and adjusted. The feed screws should be adjusted to eliminate end play and the feed nuts should be checked and adjusted if possible. The locks and gibs holding the saddle to the bed should also be checked. The bolts securing the apron to the saddle require checking and tightening if necessary. The gears in the apron should be well bushed and gear bearing pins and studs should be locked securely. The automatic feed clutches should be cleaned and adjusted for positive clutching and releasing.

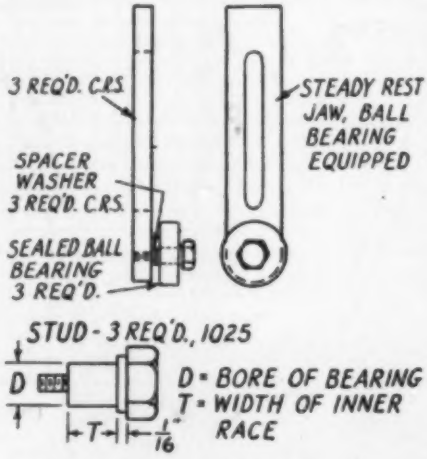
The power system operating the entire carriage requires the next inspection. The spindle stud gear and the gear train must be in good adjustment and in smooth working order. The lead screw and feed shafts should be cleaned and all end play taken up.

Inspecting the machine is as important to successful learning by the student as any other part of the operation. The student will come to know and understand his machine if he becomes thoroughly familiarized with its parts, and his knowledge will help him to analyze difficulties which may later develop. He learns to get the *feel* of the lathe so that he can turn his full attention to the operations to be learned. By getting to know his machine, the student develops a sense of security, the lack of which results in hesitation and confused thinking. In learning the use of carbide tools, as in all other operations, the student must develop an awareness and sensitivity as a necessary part of his orientation.

Setting Up the Lathe

In setting up the lathe for the turning operation, the increased possible loads must again be considered. It should be noted here that the student should be introduced to the use of carbide tools by easy stages. Many authorities feel that beginners should start working on soft or malleable castings and progress toward harder and tougher materials. In any case, the student must learn to set up for increased speeds and feeds. If the project requires chucking or faceplate turning, the chuck or faceplate should be locked securely to the spindle. The chuck jaws should be inspected carefully for *bell mouth* and the work should be prepared by grinding if necessary to insure a good seat for each jaw on the casting if the draft is marked at the point of contact. If the project is unbalanced on the spindle center, the chuck or faceplate should be counterweighted carefully to eliminate distortion of the lathe bed and resulting poor finish and eccentricity of the cut.

If the work is to be turned between centers, the centers should be seated firmly, and the dog should be set up tight. The tailstock should be set so that its spindle will have a minimum of overhang. A carbide tipped tailstock center is also recommended for turning between centers to accommodate the increased speed. If possible, a rotating dead center should be



Steady rest jaw with ball bearing

used to eliminate overheating. The use of a *live* tailstock center makes possible also the use of a large center, drilled in the ends of the work. The tailstock should be locked firmly and the tailstock spindle should be securely clamped. In the case of long shafts or cylinders to be turned or bored, an adequate steady rest or follower rest should be used. It may be a good idea to improve the bearing of the rests by adding a sealed ball bearing to each rest jaw. This can be done simply by replacing the cast iron rest jaws with steel ones and by bolting a sealed ball bearing to each rest jaw so that the outer race bears on the project.

Selecting the Tool

Selection of the right tool for a specific job is an important factor in learning to use cemented carbide tools. Conventional cutting materials such as high speed steel, cobalt, and stellite will cut a variety of materials in a wide range of speeds and feeds. In addition, these cutting materials are usually purchased with squared ends which can be ground to desired shapes. The combination of hardness and toughness in a cutting material such as cemented carbide must necessarily be designed for the particular characteristics of the material to be cut if the full benefit of carbide tools is to be derived. When a hard metal is to be cut, a tough grade of carbide is used which is relatively *soft*. If the metal to be cut is soft, an extremely hard grade of carbide is used which is necessarily less tough. Of course, the various hardnesses of cemented carbides are in a range of hardness which is much higher than the other cutting materials mentioned in the foregoing. It is possible, however, to secure a tool grade which can be said to have a combination of hardness and toughness for general use in a fairly wide range.

At this point, it might be well to introduce a new set of data to students as part of their orientation. Because of these ranges of hardness and toughness, of speeds and feeds, it becomes necessary that students become acquainted with the variety of grades of carbide and the shapes in which the tools can be supplied. Since the manufacturers' grades and shape codes have not been standardized, the manufacturers of cemented carbide tools should be consulted as a source for the information. A valuable source and one which makes available to teachers a large variety of information is the Carboloy Company of Detroit.

Coincidental with selecting the grade is the selection of shape of tool. As mentioned before, conventional cutting tools are purchased with squared ends which are ground to a desired shape. Carbide tipped tools, however, can be purchased in any number of standard shapes so that a minimum of grinding is necessary. Therefore, the student should be acquainted with the basic tool shapes for right and left hand turning and boring, for threading and for cutting shoulders. Of course, there are other shapes which are available such as cutoff tools, and forming tools. It is also possible to buy carbide tips which can be attached easily to most shank shapes by brazing or silver soldering. It is possible also, to purchase carbide tipped tools with clearance angles ground for different materials. The student should become acquainted with the great variety of shapes and grades of carbide tipped lathe tools. He should, if possible have first-hand experience in using the various shapes and grades of tools in a wide variety of applications to a number of different materials.

To select the tool for his job, then, the student must consider the material of which the project is made, the type of cut, the direction of cut, and the size and capacity of the tool holding device to be used. Selecting the tool for the job to be done is one of major importance if carbide tipped tools are to be used efficiently.

Grinding the Tool

For a number of reasons, it may be necessary, before or during the actual cutting operation, to grind the carbide tipped tool, though happily, grinding need not be done

often if done right. Of course the tool must be ground when it is dulled after much use. The tool may have to be ground in order to alter its shape. It may have to be ground also to eliminate any number of difficulties arising from improper top and bottom relief angles or to adapt these angles to the particular material to be cut.

For grinding carbide tools, a standard bench grinder can be used. However, it is desirable that a carbide tool grinder be available. It may be possible that a local machine shop has this grinding equipment and may make its equipment available to the teacher periodically. The standard bench grinder can be easily equipped with an adjustable table rest which can be made interchangeable with the standard tool rest.

of loading. If medium pressure of the tool on the wheel results in overheating, the wheel should be dressed. The tool should be kept in motion back and forth across the wheel face. A wheel coolant should not be used and if it is necessary to cool the tool, the back end of the tool may be dipped in water. If the heated tip is dipped the carbide will develop checks.

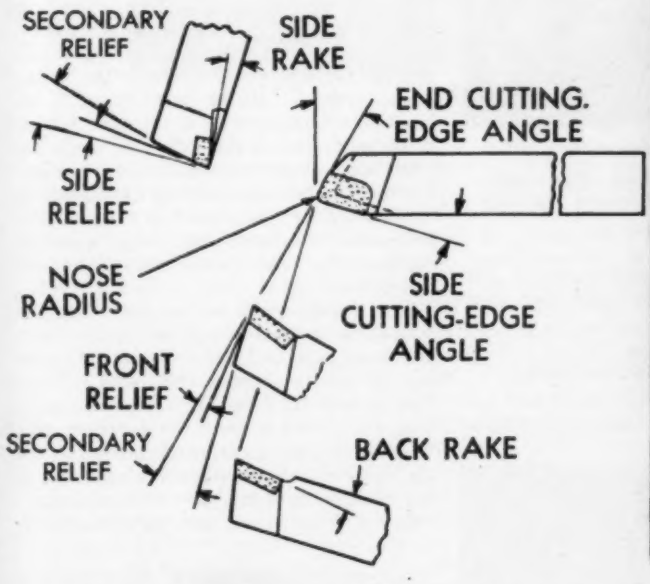
The relief angles should be checked with a protractor or a gauge. The side and end cutting angles should be checked also to be sure that the tool does not drag on the cut. In grinding a roughing or *hogging* tool, a suitable side cutting edge angle should be provided to prevent the cuttings from being turned back toward the finished part of the cut.

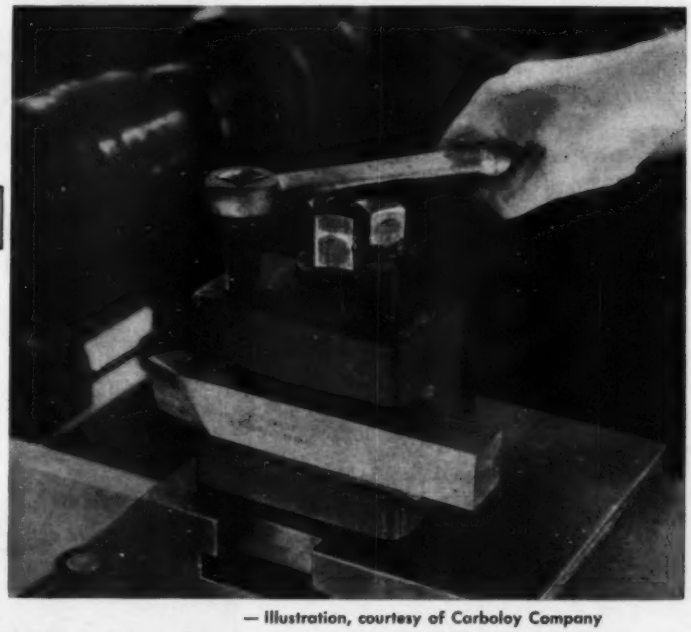
The grinding of the tip should follow a

breaker may vary to suit the job according to type of material being cut, depth of cut, and feeds and speeds involved.

The chip breaker is ground on a universal tool grinder using a universal vise. A straight resinoid bond, diamond wheel of about 100 grit is recommended. The top face of the tip and the chip breaker should have the same rake angle. In this operation, a coolant is used, usually kerosene or a solution of water and soluble oil. The depth of cut of the grinding wheel should be extremely light and should not exceed .0004 in. during any pass. The grinder in-feed limit should be predetermined and not exceeded during the operation.

The grinding of the chip breaker is an important operation and must be done carefully. A student who will have had successful ex-





— Illustration, courtesy of Carboloy Company

Standard nomenclature as applied to all cutting tools. The half tone shows a good set-up of a carbide tipped turning tool. Note the shims used to raise the tool to the proper height

In grinding carbide tipped tools, both the steel shank and carbide tip must be ground. It is recommended that the steel shank be ground with relief angles two or three degrees greater than the finish angle of the tip. Therefore when rough grinding the tool, the table rest should be set at an angle two or three degrees greater than for finish grinding so that in finish grinding the tip, the wheel will not contact the steel shank.

The grinder should be equipped with the correct grinding wheel for cemented carbide. The use of other wheels will not produce desirable cutting edges. For general grinding of cemented carbide tipped tools, the following wheels are recommended. The designations are the New Standard Marking Code. The wheels are silicon carbide.

Rough grinding — C60–18–V
Finish grinding — C80–H8–V

The wheels should be kept dressed and free

definite procedure in order to achieve a keen cutting edge. The shape of the tool should first be rough ground, alternating between grinding the shank and the tip. The top face is then rough ground. Then the front relief is ground and followed by grinding the side relief. The finish grinding follows the same order.

For advanced students, instruction in grinding a chip breaker becomes important; chip breakers are used when materials of high tensile strength or *toughness* are turned. Long cuts on steel usually result in a long, continuous chip which is both dangerous and inconvenient. In production shops, it is standard practice to grind a chip breaker on the tip. The breaker is a step ground into the top face and in the same direction as the cutting edge though not necessarily parallel to it. General, recommended dimensions of the chip breaker may be secured from the tool manufacturer. However, the width, depth, and angle of the

perience in this operation can be considered as having had a well-rounded training in grinding carbide tipped tools.

Setting the Tool

After the tool has been ground properly; it is ready to be set up in the lathe. There are a number of ways to set up the tool any one of which may be considered suitable if it meets certain requirements. The shank of the turning tool must be held horizontally and the tip of the tool must be set at the center line of the work. The tool must be held as rigidly as possible and the shank must be supported underneath with a minimum of overhang.

For light turning, the tool may be supported and clamped in the rocker type tool post. It should be set horizontally. The rocker should be removed and shims used to raise the tool to the center line. A toolholder may be used also, if necessary, but it must be one of suitable design in which the tool is held hori-

— Illustration, courtesy of Carboloy Co.

Checking relief angle of a carbide tool

zontally. The toolholder may be shimmed to the correct height. Straight, right, and left hand toolholders are available in many sizes.

For heavy work at high speeds and feeds, a rigid type of tool post should be used. It should provide a good support for the tool and should have at least two clamping screws. The

— Illustration, courtesy of Carboloy Co.

Checking side cutting edge angle of carbide tipped tool

clamp screws should never be allowed to clamp on the carbide tip. This type of pressure on the tip results in almost certain breakage. The clamp screws should have the point ends flattened and smoothed. Because the tool shank

— Illustration, courtesy of Carboloy Co.

Checking the nose radius of a carbide tool with a gauge

is relatively soft, cup or tapered points on the clamp screws chew into the shank and limit the extent of careful repositioning of the tool. The carriage should be positioned at both ends of the cut to be sure that the tool and toolholder are unobstructed.

For boring in the lathe or vertical lathe, the same precautions must be taken. The boring bar must be as heavy as can be used and it should be rigidly held with a minimum of overhang. The shank of the tool should fit the

— Illustration, courtesy of Carboloy Co.

Checking the end cutting edge angle. Insufficient angle will cause the tool to drag

hole in the bar and be well supported. The setscrews holding the tool should be in good condition.

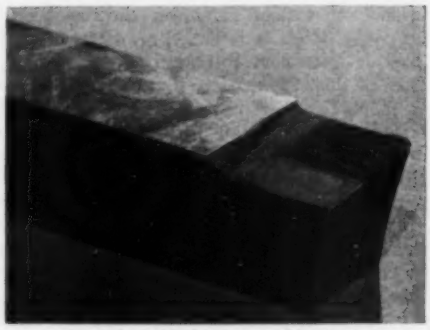
Speeds, Feeds, and Cut Depths

The correct combination of speed, feed, and depth of cut should be determined before the

— Illustration, courtesy of Carboloy Co.

The carbide tipped tool should be held in a horizontal position

actual turning or boring is begun. The full value of carbide tipped tools is manifested in the application of this combination. The student must learn to plan his jobs in terms of these three factors as a matter of course. He must learn the relationship of each factor to the other. He ought to become acquainted with the use of the manufacturers' charts



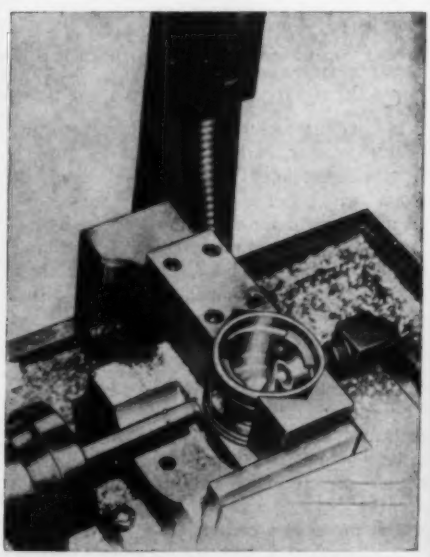
— Illustration, courtesy of Carboloy Co.

Built-up edge caused by low speeds

which recommend feed and speed ranges for the various materials in order to gain the full benefit of his carbide tipped tools.

In selecting the proper speed, there are many variable factors which make a range of speed rather than a specific speed inevitable. Perhaps the first consideration is the horsepower available. If the lathe motor is of insufficient horsepower or if the drive system is unable to deliver the full horsepower, the lower limits of the recommended speed ranges will become the surface cutting speed which is in terms of feet per minute (f.p.m.). If the horsepower is sufficient and the drive system adequate, the power factor need not be considered any further.

It is recommended at this point that the student be required to note on his job sheet the speeds and feed which are recommended for his job as evidence that he is at least familiar with the tables. If job sheets are not used, the student should make a note on some sort of job record. Another purpose of the notation is to compare with the original figures, any changes which may have to be made as a result of developments later on in the opera-



— Illustration, courtesy of Carboloy Co.

Boring wrist pin holes. Solid Carboloy boring bar

— Illustration, courtesy of Carboloy Company

tion. In this way a student develops the necessary habits of flexibility and adaptability in solving shop problems. The habits of scientific observation and analysis can be encouraged. Greater understanding can be developed in the student through systematic notations such as: the type of tool, grade of tip, description of metal as to content and hardness, and the selection of speed and feed should be noted carefully.

The feed is determined in much the same way as the speed. However the student should know that the selection of feed and speed for a particular job is not to be considered as final. The final speed and feed will ultimately depend upon the observable results during the cutting operation. However, the feed and speed should be within the recommended range if the tool is to be used to full advantage.

The depth of cut is a more variable factor as it is affected by a number of considerations and in turn affects the selection of speed, feed, and horsepower requirement. In general, the heaviest possible cut should be taken. It takes a lot of experience, however, to arrive at the point of knowing what the *heaviest cut* should be. The cut depth is first influenced by the ability of the machine and strength of the project to withstand the load of a deep cut. Another consideration is the finish desired. A well set up job can handle a relatively deep cut resulting in a reasonably good finish.

In cutting rough castings the tool should be set to cut beneath the hard *skin* but not too much beyond as the horsepower required becomes greater. If the surface of the casting is extremely rough and covered with sand pockets and holes, the depth of cut should be increased so that the tip cuts below the bottoms of these holes. The purpose here is to maintain a continuous cut and eliminate, as much as possible, the effects of intermittent cutting.

For cutting very hard or tough steels or chilled castings, the tool should not be allowed to rub on the work. If the cut is too light the tool will *spring* out and the cutting edge will break down. When the surface is extremely hard and rough or uneven, the work should be ground with a cylindrical or tool-post grinder until it is leveled so that when turning with the carbide tipped tool, the depth of cut will be uniform. This particular problem is by no means unusual in both manufacturing and jobbing shops. Certainly, the student should be aware of this problem.

Finally, with respect to the problem of speeds, feeds, and depth of cut, one must be prepared to arrange the machine settings by changing any or all of them if the results are not good. If all precautions are taken which should normally produce good results and the machine still cannot produce desirable finishes, the speed should be reduced. If the horsepower and rigidity of the machine are still inadequate the feed should be decreased and last, the depth of cut. The student will come to learn, after a number of experiences on different lathes, that all machines are not equally capable of the same loads and that in order to get the most efficient production, he must eliminate as many difficulties as possible and adapt his practices to the unalterable conditions.

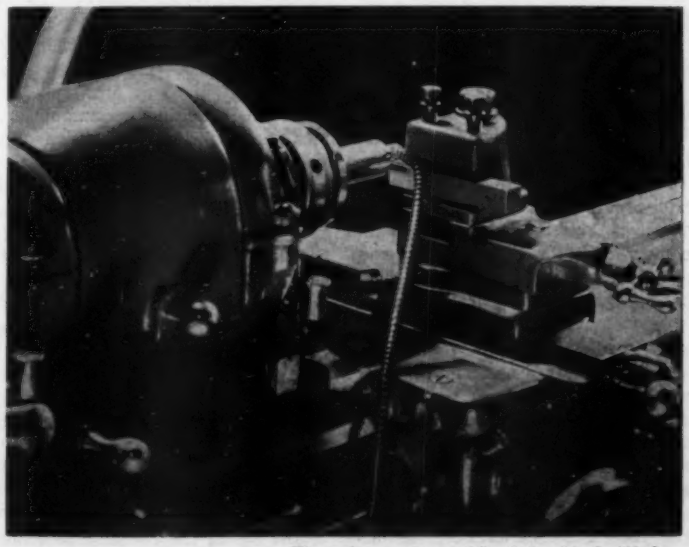
Coolant

For short jobs that are usual in most school shops, a coolant is neither necessary or desirable. It is not necessary if a great amount of heat is not generated nor desirable if the application of a coolant is insufficient. Of course, on some jobs, the speeds and feeds may have to be reduced if a good coolant system is not available. If there is provision for the system, the same coolants can be used as for conventional tools in cutting various materials. The coolant should be of sufficient flow to take all the heat away from the work and from the tool. The coolant should be directed onto the cutting edge and should drench the work as well as tip cutting tip. If the coolant is insufficient or improperly directed, the tip will be subject to radical temperature changes followed by "crazing" or checking.

Lubricating oil should not be used at any time in cutting with carbide tipped tools. In cutting very hard materials, grease or oil from the hands of the operator will impede the cutting or even make cutting impossible. Care should be taken at all times to keep the work free of grease or oil or oil vapors. The work should be wiped clean with a rag wet with a cleaning solvent if necessary.

The Cutting Operation

The cutting operation should be accompanied by confidence. The student should make a final check on all his preparations before starting his cut. He should wear goggles or a plastic shield, especially if he is turning castings at high speeds or very hard materials at very slow speeds.



— Illustration, courtesy of South Bend Lathe Works

— Illustration, courtesy of Carboloy Company

Facing a casting on a vertical turret lathe with carbide tool

The tool should be moved toward the work carefully. It should not be allowed to bump into it as the tip can be readily knocked from the shank by a sudden shock. The automatic feed should carry the tool into the work. If the hand feed is used for a test cut, the tool should move without hesitation and without haste. After several trials, the student will begin to get the *feel* of the tool as it cuts. Automatic feeding should be used as much as possible and the new student should keep his hand on the feed clutch, not on the drive clutch!

To stop the cutting, the feed should be disengaged, the tool backed away and the machine stopped. This procedure for stopping the cut should be strictly adhered to, otherwise tool damage will result. If the spindle stops during the cutting, shut off the power and inspect the tool in its cut to determine the best way to remove the tool from its position. Backing the spindle will lift the tip off the shank. It may be possible to back out the tool with the hand feed. In most situations like this, the best way to remove the tool without damage is to release the toolholder or clamp screws. If this situation occurs and it certainly will, the teacher should welcome the opportunity to show the proper procedure for removing the tool.

The cutting operation should be watched closely. The student must become increasingly aware of the total operation which he is performing. He must watch closely for any indications of tool wear as evidenced by changes in depth of cut or finish. He must learn to listen carefully for signs of overloading of the power system as evidenced by changes in speed. He must look for signs of *spring* in the work as evidenced by the work climbing up the tool above the true axis. He should watch for signs of overheating with its usual evidences. He should inspect the location of the back gears, if they are used, for signs of disengagement. The chip form should be watched closely for any evidence of change indicating wear. In short, the student must use all his senses keenly to observe the cutting as it progresses.

As the carbide tipped tool wears, the pressure of the tool increases greatly, the accuracy of the cut is decreased rapidly, the power requirement increases, and fast tool breakdown results. When the tool reaches a point of breakdown, it takes a lot of grinding to recondition the tool. The increased grinding shortens the life of the tool considerably. Therefore, the student should learn when to regrind the tool and to develop the habit of grinding it immediately if it shows signs of becoming dull.

Aside from normal wear, there are a number of types of tool failure. The tool may wear too rapidly. Speeds, feed, and depth of cut should be rechecked. The relief angles of the tool should be rechecked and the radius of the nose should be checked. If the tip is of proper grade, if work setup is adequate and if the tool is properly ground, the feed or speed should be altered. If chipping of the tip occurs, the relief angles may be too great or the nose radius may be too small, both of which weaken the cutting edge so that it cannot properly stand up under the load. If the nose radius and relief angles are correct, the cutting edge should be carefully honed with a hand stone designed for use on carbide tipped tools. Another cause of chipping may be that the cut depth is not great enough, especially in chilled castings or hard scale castings. Increasing the depth of cut may eliminate this type of failure. In cutting steel, especially the softer grades, the speed should be checked if there are signs of built up edge. This condition is common in the use of high speed steels and is a sign of insufficient side rake. When using carbide tipped tools, this condition is a result of insufficient speed usually. A light feed may also cause chipping as a result of rubbing rather than cutting, especially if the machine or its parts are not adequately rigid. Finally chipping may be caused by checking of the tip during the grinding of the tool or by an inadequate application of coolant during the cutting.

Cratering or excessive wear behind the cutting edge is another sign of tool failure. It develops, usually, as a result of a heavy chip or a chip moving slowly over the top of the tip behind the cutting edge. This condition is a serious one as it requires that the cutting edge be ground back to eliminate the crater or the top of the tip must be ground. In any case, the feed should be reduced or the speed increased. The use of a coolant sometimes eliminates this condition. Cratering often occurs along with built up edge. If cratering becomes excessive, the cutting edge may crumble or the entire tip may split.

Finally, the finish of the work may be the clue to inefficient operation of the tool. Usually, if the finish of the work is smooth, the tool is operating efficiently. The most common type of poor finish is chatter. Chatter may result from a too light or too heavy feed or depth of cut for the particular machine. It can also be caused by springing of the work or too much overhang of the tool. If a boring bar is too light, the tool may chatter. Very often, increasing the feed oftentimes eliminates the chatter. In some cases dull tools may cause chatter while in others a sharp tool may do so, particularly in cutting copper alloy castings and bar stock. Another cause of chatter may be a large nose radius or too much or too little side cutting-edge angle both of which tend to crowd the chip, overload the tip, the work, and the machine. The rule to remember here is to have the smallest possible length of cutting edge per depth of cut without weakening the tip or crowding the chip.

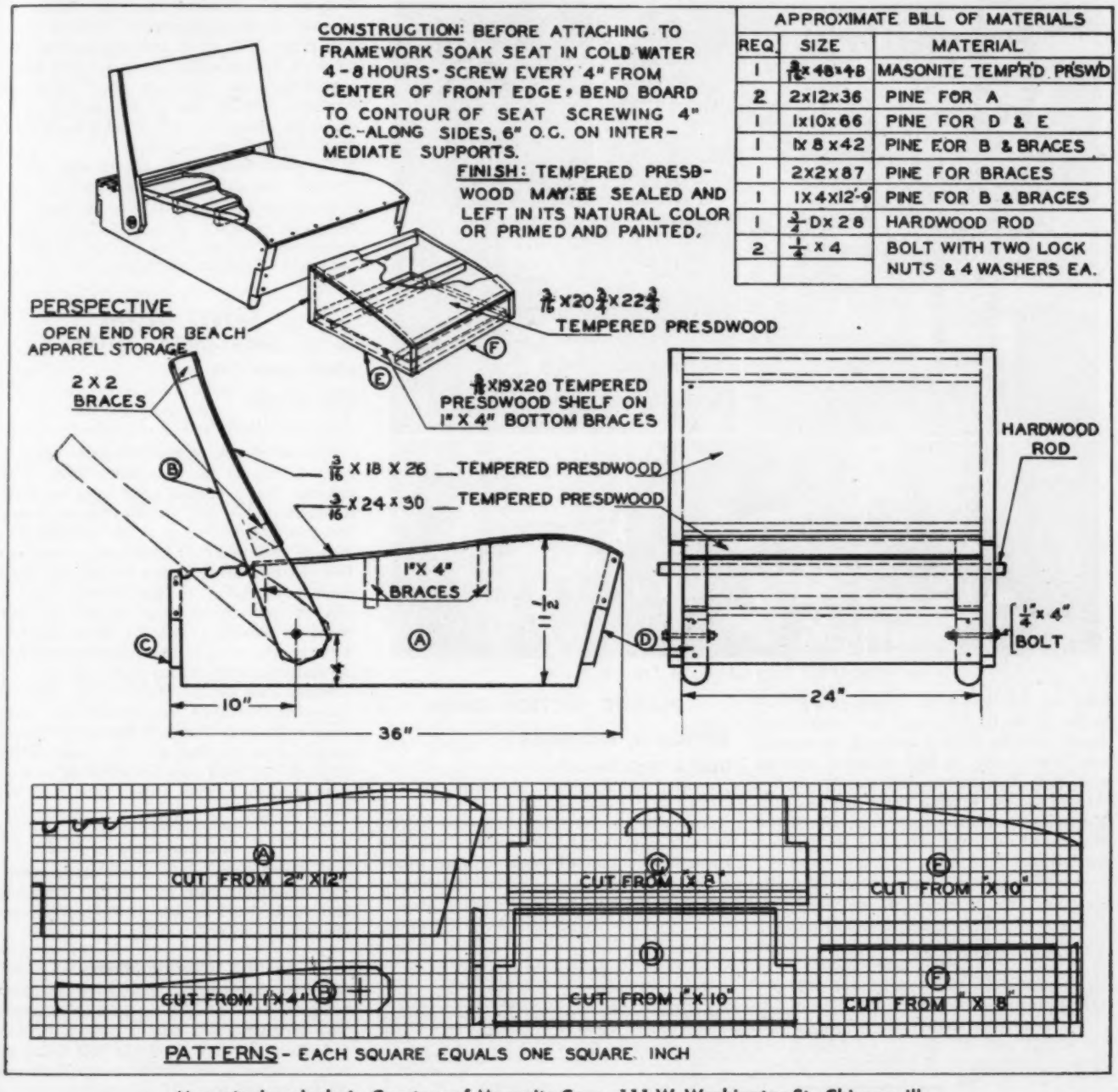
If the work surface is rough, torn, and flaky, the cause may be similar to those causing chattering. A dull tool, a built-up edge condition, too large a nose radius, too long a cutting edge or rubbing of the tool may produce this type of finish.

Most tool failures are the result of faulty tool grinding; careless operation accounts for the rest. Therefore the successful application of carbide tipped tools depends upon careful grinding and machine operation. The student who gets the opportunity to learn and master the application of tungsten carbide tipped tools is fortunate indeed; no less fortunate is an employer who can secure his services. With these skills and related information, the vocational student will have greater employability; both vocational and industrial-arts students will have had an experience affording an insight into one of the most profound technological influences on American life and indeed, present-day civilization!

There are about 7,500,000 skilled workers in industry at the present time, but our high percentage of employment and present civilian production, leaves a shrinking number of craftsmen available for rapid expansion of those industries supplying defense needs. — *W. F. Patterson.*

Summer sessions are more popular with G.I. Bill students in schools below college level than with those in colleges and universities, according to V-A statistics. Below-college-level enrollments for July 31, 1950, totaled 740,306; college enrollments were 254,976.

Various surveys disclose that disabled veterans, when properly placed, prove to be at least as good workers as their able-bodied fellow employees.


CONSTRUCTION: BEFORE ATTACHING TO FRAMEWORK SOAK SEAT IN COLD WATER 4-8 HOURS. SCREW EVERY 4" FROM CENTER OF FRONT EDGE. BEND BOARD TO CONTOUR OF SEAT SCREWING 4" O.C. ALONG SIDES, 6" O.C. ON INTERMEDIATE SUPPORTS.
FINISH: TEMPERED PRESDWOOD MAY BE SEALED AND LEFT IN ITS NATURAL COLOR OR PRIMED AND PAINTED.
APPROXIMATE BILL OF MATERIALS
REQ. | SIZE | MATERIAL
1 | 3/16 x 48 x 48 | MASONITE TEMP'R'D PRSWD
2 | 2x12x36 | PINE FOR A
1 | 1x10x66 | PINE FOR D & E
1 | 1x8x42 | PINE FOR B & BRACES
1 | 2x2x87 | PINE FOR BRACES
1 | 1x4x12'-9" | PINE FOR B & BRACES
1 | 3/4 D x 28 | HARDWOOD ROD
2 | 1/4 x 4 | BOLT WITH TWO LOCK NUTS & 4 WASHERS EA.
PERSPECTIVE
OPEN END FOR BEACH APPAREL STORAGE
3/16 X 20 3/4 X 22 3/4 TEMPERED PRESDWOOD
2 X 2 BRACES
3/16 X 19 X 20 TEMPERED PRESDWOOD SHELF ON 1" X 4" BOTTOM BRACES
HARDWOOD ROD
3/16 X 18 X 26 TEMPERED PRESDWOOD
3/16 X 24 X 30 TEMPERED PRESDWOOD
1" X 4" BRACES
1/4" x 4" BOLT
10"
36"
24"
CUT FROM 2" X 12"
CUT FROM 1" X 8"
CUT FROM 1" X 10"
CUT FROM 1" X 10"
CUT FROM 1" X 8"
CUT FROM 1" X 4"
PATTERNS - EACH SQUARE EQUALS ONE SQUARE INCH

Masonite beach chair. Courtesy of Masonite Corp., 111 W. Washington St., Chicago, Ill.

METAL TRADES TO STEP UP EFFORT FOR DEFENSE TRAINING

W. F. Patterson, director, U. S. Department of Labor's Bureau of Apprenticeship, in an address to the members of the Metal Trades Department of the AFL, at their 43rd convention in Houston, Tex., warned that apprentice training facilities in plants employing metal trades workers "may prove inadequate for an expansion of industrial production."

The apprenticeship director praised the efforts of the metal trades in establishing apprenticeship programs which now have 28,000 apprentices registered with the Bureau, but held to his warning of a need for expansion of these programs.

SHOP WORK AT THE HIGH SCHOOL, ST. FRANCIS, KANSAS

JERRY WATERS
Cheyenne Indian News
St. Francis, Kans.

The illustration in this article shows 8 of the 36 boys enrolled in the two woodworking classes of the St. Francis Community High School. The classes under the supervision of Carl M. Sperry, turn out many types of projects all the way from ash trays to writing desks. This production is made possible by the use of the many modern machines that are installed in the shop.

Some of the larger machines in the shop are: the band saw, circular saw, jig saw, two lathes, drill press, grinder, sander, and a Stanley router and shaper. By the use of these machines the classes turned out sixty projects with an estimated value of $1,000 in one year.

In the top row from the left is shown Bruce Firkins, who is working at the circular saw. Next is Jack Handwerk, who is operating the

Shop work at the high school, St. Francis, Kans.

band saw. Bill Wiggens is turning out a project on the lathe. In the second row, again from the left, Delmar Raile is operating the circular saw. Next to him is Ned Holliman working at a lathe. Bottom row, left to right, is Lee Wieck, who is sanding some lumber. Ray Meyers is using the grinder, and last is Bill Maupin, who is doing some work in the finish room.

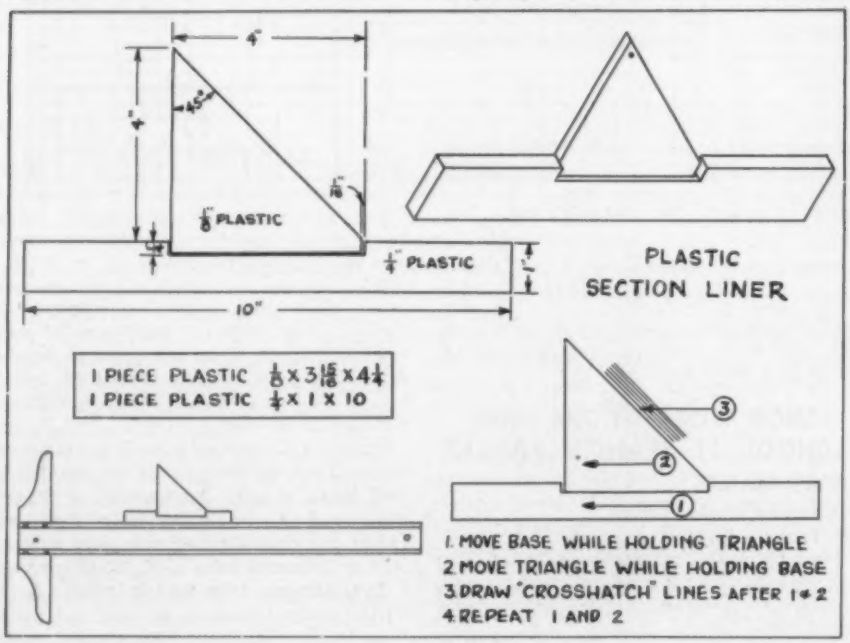
PLASTIC SECTION LINER

GEORGE N. BOLLINGER

Dublin High School

Street, Md.

A section liner for the mechanical drawing room is one of those instruments which is frequently improvised when its need arises.


4"
45°
⅛" PLASTIC
¼" PLASTIC
10"
PLASTIC
SECTION LINER
1 PIECE PLASTIC ⅛ X 3 15/16 X 4¼
1 PIECE PLASTIC ¼ X 1 X 10
1. MOVE BASE WHILE HOLDING TRIANGLE
2. MOVE TRIANGLE WHILE HOLDING BASE
3. DRAW "CROSSHATCH" LINES AFTER 1 & 2
4. REPEAT 1 AND 2

Without a mechanical liner the student is seriously handicapped when a sectional view is required. The effort and the material required in making section liners are very small compared to the gratifying results obtained in neater drawings, for there is nothing that effects the appearance of a drawing more than poorly executed section lining.

The plastics area in the general shop would welcome the section liner as an easily constructed, useful project. When several are made, the width of the section lines can be varied from 1/16 in. to ⅛ in. by increasing the length of the slot which holds the triangle.

SAFETY IN THE SHEET-METAL SHOP

LOUIS BAROCCI

High School

Cudahy, Wis.

Considering the number of sharp-edged or pointed tools in the sheet-metal shop, it is apparent that a definite effort must be made to convince a boy that he must exercise caution and good common sense in the use and handling of these tools. To stress safety even before the boy has a chance to use the tools, even to the point of demonstrating how a careless and improper use of the tool will result in accidents, may be good practice. Scratch awls, snips, dividers, and hammers can be dangerous when not handled correctly.

Equip each bench with a brush. Make a real effort to have the student use these brushes for removing steel trimmings. Never remove scrap cuttings with the hand. Safety demands that each class be permitted to start work on clean benches, free from steel slivers and clippings.

The Bar Folder

1. Before using, set the machine properly.
2. Adjust the work with the left hand, and remove the hand as soon as the machine has grasped the material.

The Squaring Shears

1. This machine has crippled the hands of many workers, because the shears frequently have no guards.
2. Keep the area about the foot pedal absolutely clear of any material, as well as free of wet or oily spots. If the operator slips or trips while operating the machine he may be injured seriously.
3. Never cut material less than three or four inches wide on this machine. Use the hand shears for such small pieces.
4. Keep the fingers away from the cutters.
5. When the machine is not in use, fasten the foot guard.

The Cornice Brake

1. This machine can mangle fingers easily and seriously; therefore, use it with great care.
2. When clamping the material, allow clearance for the fingers.
3. Keep an eye on the counter balance. Permit no one to handle the counter balance.

The Stakes

1. Be careful of sharp-pointed ends.
2. Handle stakes carefully!
3. Keep stakes clean. Be careful to remove all oil and grease from them.
4. Keep stakes in a definite place in the shop.

The Forming Machine

1. When made for heavy duty, these machines generally have a crank on each end. Two people are supposed to operate it. Having two operators makes the machine very dangerous, as two people never think the same way at the same time; hence, when one worker at one end is turning the crank, the other worker may be doing something else and the crank may come up and strike him on the face. It is safer, if work is heavy, to have two persons turn one crank only. If the machine has two cranks, take one off and hide it.
2. To avoid pinching fingers, always insert material cautiously.

The Bench Machines

1. Beading machine
2. Crimping machine
3. Wiring machine
4. Burring machine
5. Turning machine
6. Setting down machine

To avoid being cut by the metal and to avoid having the hand or fingers pinched between the rolls and gears, operate these machines very carefully.

The Furnaces

1. Check and keep the fittings tight.
2. Do not permit students to crowd the furnace.
3. When lighting, first strike the light; then turn on the gas.

The Soldering Agents

1. Use flux sparingly.
2. Avoid getting flux on hands or on other parts of the body.
3. Keep muriatic acid away from other chemicals. Use sodium carbonate to flush and neutralize it.
4. When mixing acids and water, never pour water into acids, but always acid into water. Be careful that the acid does not spatter in your eyes or on your hands.

The Solder

1. Be on the lookout. It may be hot.
2. Be careful of sharp, jagged edges.

The Soldering Coppers

1. Be careful of falling (hot) solder.
2. Do not test it with your hands or by passing it near your face.
3. Be certain that the handles are securely fastened to the coppers.

The Electric Soldering Copper

1. When repairing it, always disconnect it.
2. Watch the cord for breaks in insulation.
3. Snap the switch when the copper is not immediately needed and when you are through using it.
4. Always lift the copper by the handle.
5. Rest the copper on the holder provided for this purpose.
6. While waiting for the copper to heat, never leave the shop.
7. Before putting the copper away, permit it to cool completely.

When Soldering

"1. Wear suitable goggles and gloves.
2. Keep sleeves rolled down and shirt collar closely buttoned.
3. When melting solder, first make sure that pot or ladle is thoroughly dry and place the container in a secure position where it cannot upset.
4. Never dip a moist object into the solder pot or ladle and never put chilled solder into it.
5. Make sure there is no moisture where you pour solder.
6. Keep the hot irons away from all flammable materials. Keep them on racks or holders.
7. Always turn off the current from electric soldering irons when you leave the work place.
8. It is dangerous to yourself and others to snap or throw solder to get it off a hot iron.
9. Before starting to solder any container that may have held flammable liquids or gases, make sure that all explosive vapors have been removed."[1]

Concerning Galvanized Iron, Tin Plate, Black Iron, Wire, Etc.

1. Always handle it carefully.
2. When cutting, be careful to avoid slivers or ragged edges.
3. When handling large sheets, be careful to avoid injuring a fellow worker.

In the sheet-metal shop the student must exercise care in all soldering operations, in the use of pointed tools, squaring shears, corner brakes, stakes, forming machines, bench machines, gas furnaces, soldering agents, and electric soldering coppers.

Any work carelessly done on the machines mentioned above may result in injury to the operator or his fellow worker.[2]

[1]Safety Instruction Card No. 104. National Safety Council, Chicago, Ill.

[2]Herbert Ritzman, Instructor of Sheet Metal. Superior Vocational School, Superior, Wis., 1938. *Safety Standards and Recommendations for School Shops*, published by School District of Lancaster, Pa., 1934, pp. 70–80. Safety Instruction Card No. 104. National Safety Council, Chicago, Ill.

FOLDING CARD TABLE TOP

PETER G. POLOWNIAK
Industrial Arts Teacher
Thomas Jefferson Junior High School
Passaic, N. J.

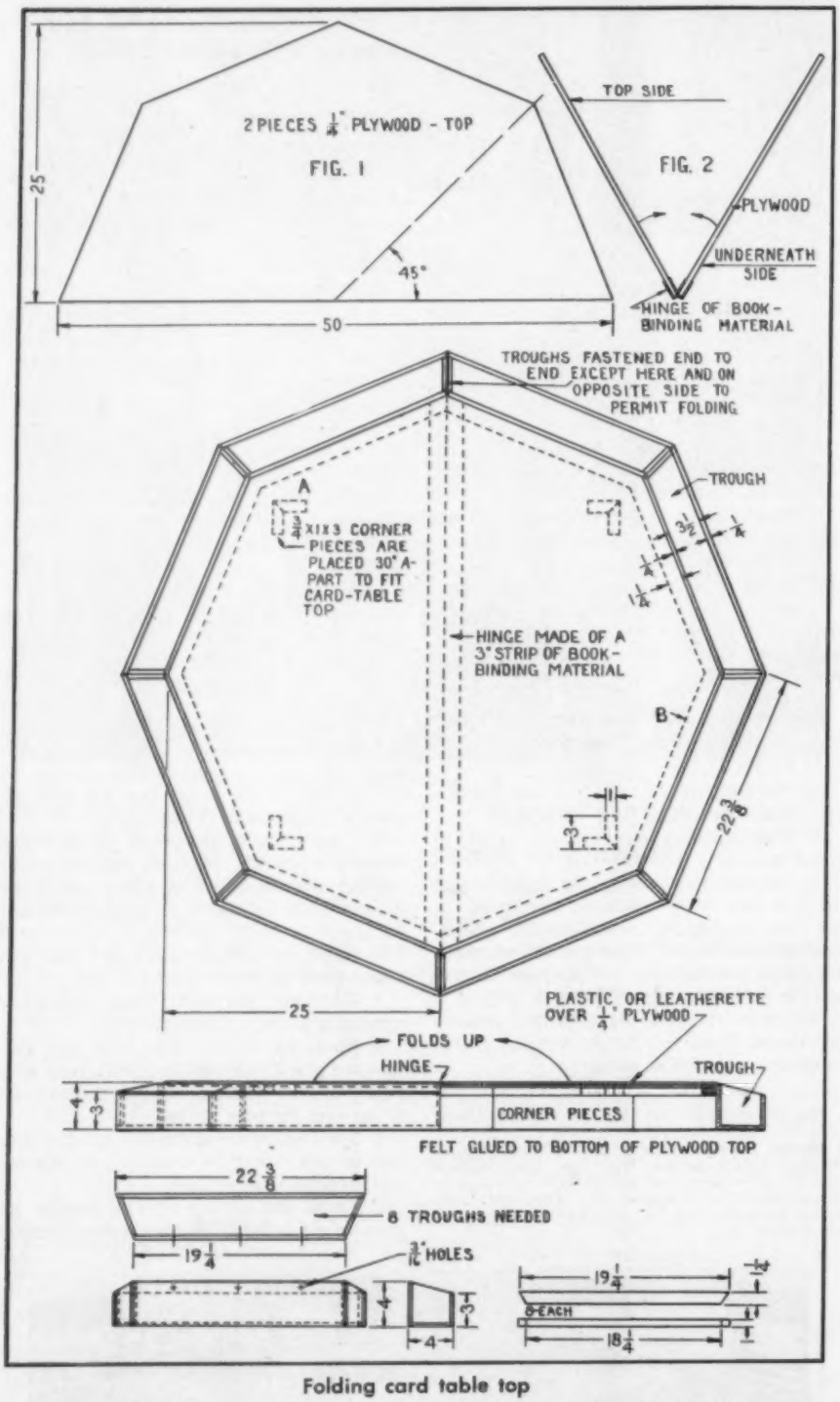
The top described in this article has many advantages over the square top of the ordinary card table. It will accommodate eight players comfortably around its octagonal shape. There are eight troughs; one for each player, which can be used for refreshment glasses, chips, extra decks of cards, or what have you, thereby leaving the top free for card playing. It is designed to fit over a 30-in. square card table top. When the game is over, the top is folded and put away with the card table.

The construction is very simple. The project presents an opportunity to work with several different kinds of materials.

Suggested steps for construction:

1. Cut two pieces of ¼-in. plywood to the shape and size shown in Figure 1.
2. Place one piece of plywood evenly over the other. Cover a 3-in. wide piece of bookbinding material with a good strong glue, and glue it along the longest edge of the two pieces of plywood so that 1¼ in. lies on the top piece of plywood, ½ in. folds over the double edge, and 1¼ in. laps on the underside of the bottom piece of plywood. After the glue has set, unfold both pieces out flat and glue another 3-in. piece of bookbinding material on the top side of this joint. This will now become a hinged joint (Fig. 2).
3. Using a thin glue size coat the underside of the two pieces of plywood. Fold the pieces together and with paper hanger's paste, glue a piece of thin felt over the previously sized surface.
4. Cover the corner pieces with felt and fasten them into place (A).
5. With glue and wood screws fasten the eight edge pieces as indicated (B).
6. Open top out flat, coat with thin glue size, and glue either plastic or leatherette with paper hanger's paste, permitting the material to lap over the edge pieces.
7. The troughs are nailed and glued, end to end, in such a way as to make two separate half sections of an octagon.
8. Finish the outside of the troughs by staining and brushing on a waterproof, alcohol

Folding card table top



Folding card table top

resistant, dull hand rubbed effect varnish. To give the inside that soft felt lined finish, brush on an undercoat of adhesive material and blow on a desired color suède-tex.

9. Fasten the two trough sections with wood screws to each of the hinged leaves of the top.

By July 31, a total of 358,091 veterans exhausted their entitlement to further G.I. Bill training, while another 209,595 disabled veterans, all Public Law 16 trainees, were declared rehabilitated.

One major study showed that the handicapped suffer fewer serious accidents and build up better production records than do those without physical impairments.

A VOCATIONAL SELF-RATING SCALE FOR CARPENTRY

ERNST H. SUERKEN
Supervising Principal
Union Free School District,
Greenburgh Number Eleven
Dobbs Ferry, N. Y.

The following self-rating scale sets forth the essential requirements for successfully entering carpentry as a vocation, if, in addition, the essential preparation has been acquired. The scale includes scholastic requirements, physical requirements, mental requisites, personality requirements, special complementary abilities, compulsory complementary abilities, and native complementary abilities.

Your interest in carpentry indicates that you have a desire to be a skilled artisan. A grade school and high school education plus trade school training or a technical apprenticeship are the usual approaches to carpentry as a vocation. An interest in architectural design, historic architectural styles and types with an understanding of the specifications thereof are also helpful. To be successful as a carpenter one must also be interested in working with wood or lumber and be able to construct according to set plans.

In filling out the scale an arbitrary passing grade of seventy per cent has been established. Place your ratings for each subject or requirement in the parentheses provided. Each section should be averaged in the manner indicated and placed on the 0–100 scale provided.

Scholastic Requirements

Algebra ( ) arithmetic ( ) business English (and) correspondence ( ) drawing, free hand ( ) drawing, mechanical ( ) geometry ( ) industrial arts ( ) physics ( ) operation of mathematical slide rule ( ) related subjects ( )

Technical

Building restrictions ( ) costs ( ) cabinetmaking ( ) designing ( ) details ( ) erection ( ) first aid ( ) joinery ( ) lumbering ( ) labor law ( ) compensation law ( ) materials and supplies ( ) reading maps ( ) safety and safety devices ( ) technical terms ( ) technical knowledge ( ) woodworking machinery ( ) wood: variations and qualities ( ) patternmaking ( ). Add together all your scores and divide by the total number in this section to get your rating. Now place your rating on the scale provided at the requisite point.

0	10	20	30	40	
50	60	70	80	90	100

Physical

Health ( ) stamina ( ) robust physique ( ) agility ( ) muscular control ( ) sight ( ) touch ( ) strength, neck ( ) strength, back ( ) strength, arms ( ) strength, hands ( ) strength, legs ( ) equilibrium ( ) endurance, standing ( ) ability to work at high elevation ( ) ability to work underground ( ) endurance to

exposure ( ). Add together all of your scores and divide by the total number in this section to get your rating. Place the result on the scale provided at the requisite point.

	0	10	20	30	40
50	60	70	80	90	100

Mental

Constructiveness ( ) creativeness ( ) originality ( ) common sense ( ) aptitude ( ) accuracy ( ) training ( ) order ( ) energy ( ) observation ( ) resourcefulness ( ). Add together all of your scores and divide by the total number in this section to get your rating. Now place your rating on the scale provided at the requisite point.

	0	10	20	30	40
50	60	70	80	90	100

Personal Traits

Commanding ( ) even tempered ( ) thoughtful ( ) encouraging ( ) firm ( ) patient ( ) curious ( ) industrious ( ) impartial ( ) persistent ( ) personable ( ) systematic ( ) humane ( ). Add together all of your scores and divide by the total number in this section to get your rating. Now place your rating on the scale at the requisite point.

	0	10	20	30	40
50	60	70	80	90	100

Special Complementary Abilities

Precision ( ) dexterity ( ) organization ( ) efficiency ( ) speaking, commandingly ( ) speaking, concisely ( ) freehand drawing ( ) handwriting, legible ( ) skillful criticizing ( ) keen detection ( ) ability and efficiency to estimate costs and materials ( ). Add together all of your scores in this section and divide by the total number in this section to get your rating. Now place your rating on the scale provided at the requisite point.

	0	10	20	30	40
50	60	70	80	90	100

Compulsory Complementary Abilities

To endure drudgery ( ) to rule by respect and not by fear ( ) fair judgment ( ) understand broken dialect ( ) to cope with any emergency ( ) ability to adjust matters ( ) ability to supervise others ( ). Add together all of your scores in this section and divide by the total number in this section to get your rating. Now place your rating on the scale provided at the requisite point.

	0	10	20	30	40
50	60	70	80	90	100

Native Complementary Abilities

To be mechanically inclined ( ) to have the ability and the efficiency to execute given detailed instructions ( ). Add together all of your scores and divide by the total number in this section to get your rating. Now place your rating on the scale at the requisite point.

	0	10	20	30	40
50	60	70	80	90	100

Now place your score for each section in the place provided:

Scholastic and technical Score: .....
Physical Score: .....
Mental Score: .....
Personal traits Score: .....
Special complementary abilities Score: .....
Compulsory complementary abilities Score: .....
Native complementary abilities Score: .....
Total .....

Total Divided by Seven Equals Your Rating

This is your rating in relation to carpentry as a vocation. Below seventy you should not consider carpentry as a vocation; between seventy and eighty you would only be a fair or mediocre carpenter; while between eighty and ninety the chances are that you would be a good carpenter; between ninety and a hundred your chances for success would be excellent.

THE TOOL ROOM KEEPER

TROY C. BOND
Assistant Principal
Dallas Vocational School
Dallas, Tex.

Kenneth W. Hast, instructor in the machine shop department of the Dallas Vocational School, has solved the problem of utilizing the services of a student to serve as tool room keeper without penalizing the student. By placing the tool grinding machines inside the tool room, the student completes a part of his regular course outline during his assigned turn of serving as tool room keeper.

Practically all instruction in the Dallas Vocational School is on an individual basis. Each student completes the course of study as rapidly as he can.

A system of using tags has been worked out for checking tools in the machine shop department. By using this system the tool room keeper has time to complete a unit of his work as well as to operate the tool room. It is his responsibility to keep tools sharpened and in good condition.

Since beginning this plan the problem of dissatisfied tool room keepers has changed to an enthusiastic desire to serve regular turns.

The tool room keeper

COLONIAL COFFEE TABLE

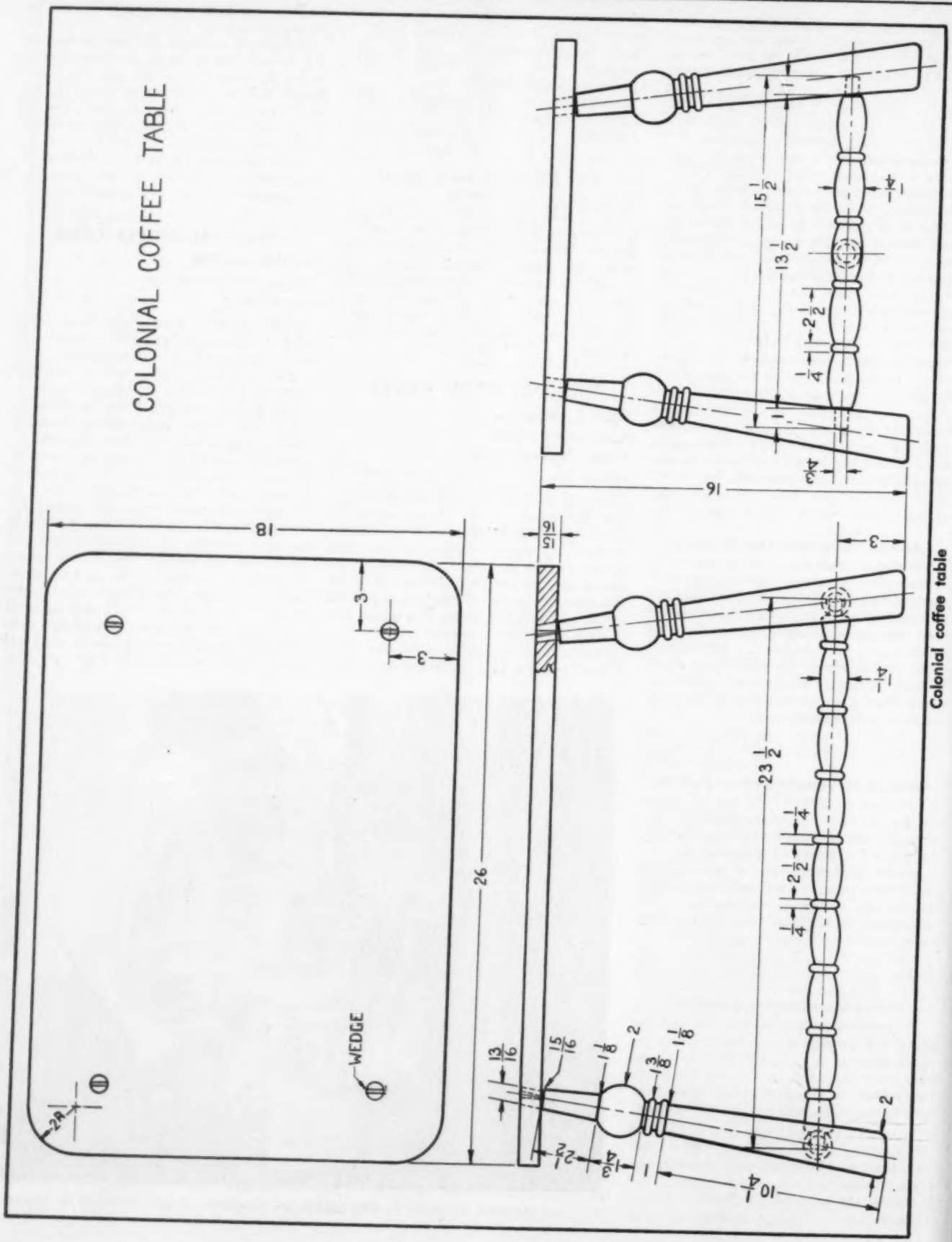
RONALD NUTTER
General Shop Instructor
Passaic, N. J.

Early Colonial design lends itself very nicely to the ability and skill of boys in the senior high school cabinetmaking shops.

The coffee table shown here is simplicity itself, yet attractive in almost any setting.

The material used will depend on the finish that is to be applied. If the colonial woods are used, in keeping with the design, maple, birch, cherry, or walnut will make an attractive table. The table shown was made of birch, finished in honey maple stain, then lacquered.

Construction begins by gluing up stock for the top. A good grade of furniture glue should be used. After the top has been squared and the corners rounded, the holes for the tenons are bored on a slant of 3 in., in both directions. The author found that a satisfactory jig can be made out of a block of scrap wood 2 in. thick, and 5 in. square. Locate the center 3 in. from two adjacent sides of the block and with a T bevel very carefully bore a 13/16-in.


COLONIAL COFFEE TABLE
91
81
26
3
WEDGE
23 1/2
15 1/2
13 1/2
2 1/2
10 1/4
22
Colonial coffee table

hole through the block. Use the block as a guide, clamped to the table top when boring the four holes for the tenons of the legs.

Next the four legs are turned with a tenon long enough to extend through the top. The spreaders are also turned with ¾-in. tenons as shown.

The legs are put in place, but not fastened; then locate the holes for the spreaders. Remove legs, and bore holes carefully to keep the legs aligned. Locate and bore holes for the spreaders. A slot is cut in the tenon of each leg, to receive a wedge when assembling. This slot should be at right angles to the grain in the top of the table.

Gluing is done all at the same time, and a wedge is glued and driven into the top of the legs. Cut off tenons and wedges, leaving about 1/16 in., so that they can be finished flush with the top. This wedge construction is a characteristic of Colonial furniture.

After a thorough sanding proceed with the finishing.

PERPETUAL CALENDAR

FRANKLIN H. GOTTSHALL
Boyertown, Pa.

Most boys like to make, and operate gadgets. Since this also applies to many grownups, this perpetual calendar should appeal to a great many home workshop enthusiasts.

The project may be made of solid stock, or of plywood, but other types than the fir veneered variety of plywood are preferable.

First make the ends *E*, bottom *J*, and back *H*, of the box. Then turn the dials *A*, *B*, and *C*, and drill the ¼-in. holes through the middle of each to place it on the dowel rod. All of the dials may be turned from a single cylinder 2 in. in diameter, and about 5 or 6 in. long. The drilled holes may need some sanding to make the dials turn easily on the dowel rod.

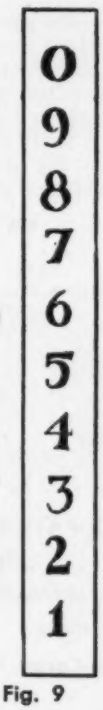
After the dials have been turned, file serrated edges as indicated in Figure 6. It is best to make a paper pattern first, to get the serrations uniform in size.

The dial bands with the names of each month, shown in Figure 8, and those with the numbers, shown in Figure 9, may be printed with India ink on paper and then glued to the dials. Full-sized patterns for tracing are shown.

When the dials have been completed, and properly fitted to the dowel rod, this rod may then be glued to the holes in the ends *E* of the box. After this has been done, and before the glue has set, the bottom and the back may be nailed to the ends.

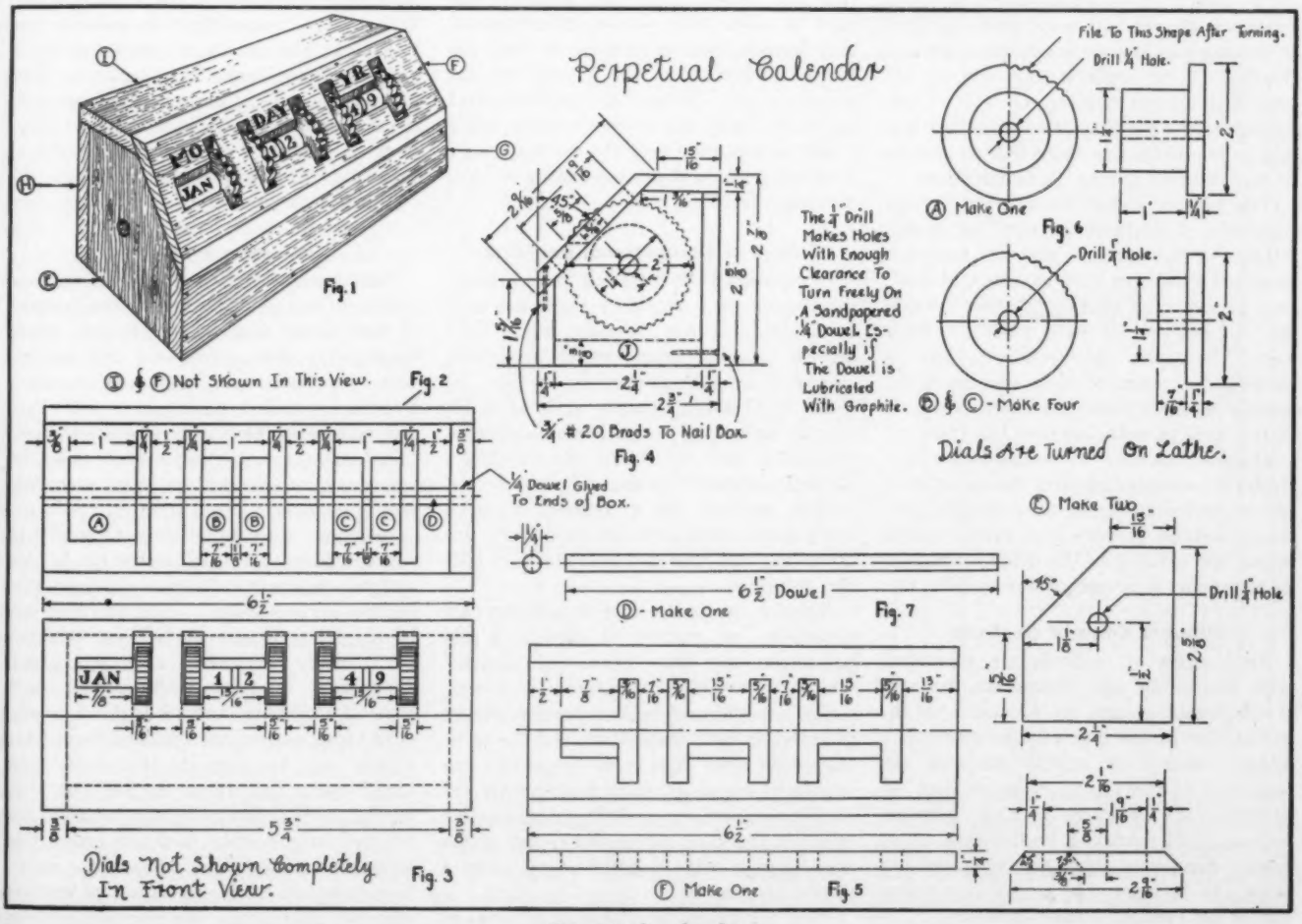
Band for Dial Ⓐ - Make One

Fig. 8



Band for Dials Ⓑ & Ⓒ - Make Four

Fig. 9


Perpetual Calendar
MO
DAY
YR
JAN
Fig. 1
Ⓘ & Ⓕ Not Shown In This View.
Fig. 2
Dials Not Shown Completely In Front View.
Fig. 3
¾" # 20 Brads To Nail Box.
Fig. 4
¼ Dowel Glued To Ends of Box.
Ⓓ - Make One
6½" Dowel
Fig. 7
Ⓔ Make Two
Drill ¼" Hole
Ⓕ Make One
Fig. 5
File To This Shape After Turning.
Drill ¼" Hole.
Ⓐ Make One
Fig. 6
The ¼" Drill Makes Holes With Enough Clearance To Turn Freely On A Sandpapered ¼" Dowel. Especially if The Dowel is Lubricated With Graphite.
Ⓑ & Ⓒ - Make Four
Dials Are Turned On Lathe.

Perpetual calendar

Next make, and then nail to the box, the top *I*, and the front *G*.

The slanted dial board is made and nailed to the box last. Details for making it are shown in Figure 5.

The choice of a finish is left to the individual craftsman. The box may be painted, stained, and varnished, or shellacked.

BILL OF MATERIAL

No. of pieces	*Name*	*Size*
5	Dials *A*, *B*, and *C*	Turn from cylinder 2 dia. x 5 or 6 in.
1	Dowel rod *D*	¼ dia. x 6½ in.
2	Ends *E*	⅜ x 2¼ x 2⅝ in.
1	Back *H*	¼ x 2⅝ x 6½ in.
1	Bottom *J*	⅜ x 2¼ x 5¾ in.
1	Front *G*	¼ x 1 5/16 x 6½ in.
1	Top *I*	¼ x 1 3/16 x 6½ in.
1	Dial board *F*	¼ x 2 9/16 x 6½ in.

OCCUPATIONAL DEAFNESS IN INDUSTRY

DR. WALDEMAR SCHWEISHEIMER
Lowell, Mass.

Noise Causes Deafness and Fatigue

Here are some statistical figures by H. F. Smith. Of 75 smiths and machinists examined 40 per cent were definitely hard of hearing and only 39 per cent had normal hearing. Of 40 coppersmiths only 10 per cent had normal hearing. Of 100 boilermakers only 9 per cent had normal hearing, and in another study there was no case of normal hearing among 31 boilermakers.

The noisiest industries had the highest incidence of deafness for any age group. McKelvie, in a study on weavers' deafness, recorded a 24.3 per cent incidence of deafness among more than one thousand weavers; 6.7 per cent of them was nerve deafness. The latter type which is due to prolonged exposure to noise, was not found among weavers who had been employed in this kind of work less than ten years.

Quite a few medical authors state that deafness is connected with the occupation of locomotive crewmen. Drop forging produces deafness by very loud, sudden noises which are harmful to the drum membrane or the bone structure of the middle ear.

Different Kinds of Deafness

Most cases of deafness are connected with the middle ear. Temporary deafness is frequently caused by a catarrh or inflammation of the tube (Eustachian tube) which connects the middle ear with the rear part of the throat. Signs of such an infection are defective hearing, earache, buzzing, and humming in the ears all of which disappear when the inflammation clears up. In most cases, temporary noises can be banished by proper treatment.

Occupational deafness may be connected with an ailment of the middle ear, called otosclerosis. It consists basically in a gradual growing together of the three small bones behind the drum membrane — commonly called hammer, anvil, and stirrup. The tendency to otosclerosis may be inherited and may, therefore, appear in several members of one family. People whose family history tells of cases of otosclerosis, better choose an occupation which has nothing to do with noise. It is easier for many people to get accustomed to poor hearing than to the continuous presence of humming, buzzing, and ringing sounds within the ears. Such noises, be they temporary or permanent, are most disturbing.

Illnesses of the inner ear, the actual nerve of hearing (nervous acusticus), are often after effects of infectious diseases such as scarlet fever, typhoid fever, grippe. It seems evident that the auditory or acoustic nerve is most sensitive to the poisons and toxins of infectious diseases. Faulty metabolism, diabetes, gout, arteriosclerosis, and blood diseases affect the nerve as well. Abuse of alcohol, nicotine and narcotics may, in course of time, injure the nerve. Industrial workers who have to work with poisonous substances, may become hard of hearing or deaf due to the influence of the poison on the acoustic nerve. Continuous noise will affect the fine cells of the auditory nerve, while a sudden explosion near the ear may cause a bleeding in the drum membrane or even a rupture of it.

Causes of Occupational Deafness

Occupational deafness begins as a slight impairment of a frequency range not used in ordinary speech. It may result from several types of injury which have been compiled in a recent study by Dr. A. Goldner. Pressure changes, such as in recurrent aero-otitis media (inflammation of the middle ear) of aviators and the effects of decompressed nitrogen in the ears of caisson workers, are a frequent cause of occupational deafness. In fact, they are more frequent than deafness due to a sudden injury.

Various chemicals used in industry are known to be capable of causing a degeneration of the nerve of hearing which may result in deafness. Such materials are quinine, lead, tobacco, arsenic, phosphorus, carbon disulfide, and the paraphenylene dyes. The most frequently encountered causes of such deafness are explosive concussions and the degenerative effect of constant subpainful noises which are injuring the acoustic nerve over a period of time.

The minimum level for this type of noise injury, according to Goldner, is generally believed to be about 80 decibels, which may require two or more years. The word *decibel* is the name of the unit used to measure noise. Special noise-meters or audiometers record the loudness of sounds in units called decibels or phons. If we take the average loudness of a conversational voice as about 50 decibels, a whisper at five feet distance measures about 10 decibels, which is very quiet.

On the other hand, the noise in the machine shop of a textile mill rises to 90 decibels, somewhat more than in a large typists' office. A structural riveter causes a noise of 100 decibels; in a boiler factory it might be 105 decibels; an airplane motor, 20 ft. away, produces 120 decibels. The hellish racket of a pneumatic drill in the street may be as high as 190 decibels. The boundary line between noises which cause hearing losses and those which do not, seem to lie between 80 and 90 decibels.

Noise produces not only deafness, but fatigue as well. In noisy environment it is necessary to concentrate harder to accomplish the same amount of work, and this strain on nervous tension and attention produces fatigue. H. J. Sabine and R. A. Wilson have stated that in quite a few instances noise has been a major factor in excessive labor turnover in factories. This is especially true of women employees who are not accustomed to factory noise. They stress the necessity of preventing reverberation and of localizing the noise to the vicinity of the machine.

Protection of Hearing

Sabine suggests some measures for protection of workers from noise: employment of men rather than women for jobs where noise is excessive; frequent rest periods to relieve the strain of prolonged exposure to noise; provision of simple ear defenders; and recognition that work in extreme noise takes more out of the worker than the same amount of labor in quiet surroundings.

Goldner, however, does not believe in ear defenders. He calls protection by ear stoppers against continuous noise unsatisfactory. In his opinion, prevention of occupational deafness can be best achieved by acoustic engineers, and by careful elimination of those workers who show signs of a tendency toward deafness or who suffer from a purulent inflammation of the middle ear. He suggests that noisy jobs could better be given to workers with partial (conductive) deafness who do not register fatigue when they are exposed to intense prolonged high tones. This would be better than to give those jobs to workers with normal hearing. He also recommends periodic examinations of the sense of hear-

ing of workers who are engaged in noisy occupations.

Elimination of the noise source by better engineering is most important in industry to avoid occupational deafness. Faulty design of machinery, worn machine parts, improper machine mounting, improper location of machines, and carelessness in operating machinery are contributing to occupational deafness, and the engineer rather than the doctor may prevent harm to the worker.

VOCATIONAL FACTS

(Continued from page 19)

4 — You are most probably best suited for one certain vocation, but the fact remains that you may follow and succeed in any one of several different possibilities. The major question is, "What are these several vocations?"

A Vocational Dictation: Fact 5 — Your native aptitudes and abilities, together with scholastic subjects which you most easily master and in which you grade highest, should strongly influence final selection when analyzing separate vocational requirements and suggestions.

A Good Point to Remember: Fact 6 — Intelligent vocational selection is based upon an analysis of a *combination* of numerous facts and *not* upon just one or two facts.

Preparation Versus Success: Fact 7 — Preparatory requirements of any one vocation, necessary to qualify or practice are of one group. Additional requirements are necessary to succeed.

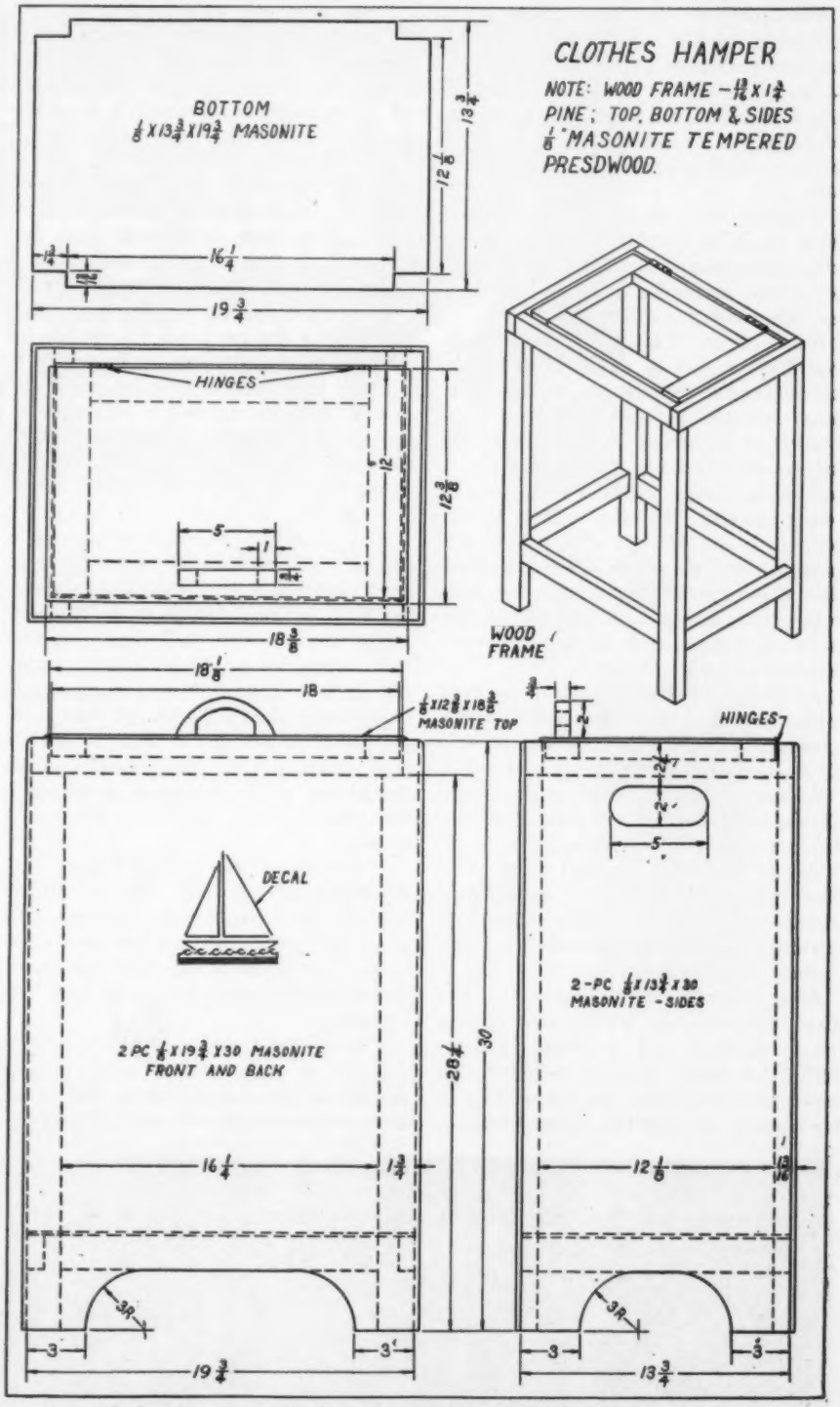
Financial Service Rewards: Fact 8 — In the majority of cases, your pay envelope includes a sum that is in proportion to the quality and value of services rendered. Depression and inflation periods naturally alter normal compensation rates.

Statistics Regarding Financial Rewards: Fact 9 — Speaking generally, statistics prove that an individual's opportunity for earning and accumulating great wealth are decidedly more favorable within the trading vocations, buying and selling. This does not mean the purchasing agent or salesman but rather those directing a trading business.

Rating Versus Overrating Yourself: Fact 10 — Overrating your abilities dishonestly, boastfully, or innocently, will sooner or later prove your error and possible failure. Therefore, joint study and consultation are absolutely necessary to insure safety.

Vocational Decision: Fact 11 — Decision should be the result of the following: (*a*) deep thinking and concentration; (*b*) reference and research; (*c*) consultation, if possible, with well-informed and successful men and women; (*d*) the highest respect for the vocational responsibilities to be assumed; (*e*) decisions should not be subject to change, without a most excellent and justified reason.

A Common Error and Punishment: Fact 12 — Too often, parents, guardians, and friends suggest, influence, or demand that others study and train in vocations which later prove to be completely foreign to the individual's native and scholastic dictates. Everyone is punished when this course is pursued.


CLOTHES HAMPER
NOTE: WOOD FRAME – 1 1/16 X 1 3/4 PINE; TOP, BOTTOM & SIDES 1/8" MASONITE TEMPERED PRESDWOOD.
BOTTOM
1/8 X 13 3/4 X 19 3/4 MASONITE
HINGES
WOOD FRAME
1/8 X 12 3/8 X 18 3/8 MASONITE TOP
HINGES
DECAL
2 PC 1/8 X 19 3/4 X 30 MASONITE FRONT AND BACK
2-PC 1/8 X 13 3/4 X 30 MASONITE - SIDES

Clothes hamper with Masonite top. Courtesy of Masonite Corp., 111 W. Washington St., Chicago, Ill.

Not Scientific: Fact 13 — There is no positive or scientific set of rules to guarantee your vocational choice or success.

Diploma Required: Fact 14 — Certain vocations require passing tests to qualify for a diploma or license to practice. Examples: medicine, law, nursing, social work, etc.

Diploma Not Required: Fact 15 — Other vocations do not require a diploma or license as related to scholastic standards to practice. Examples: practical engineering, salesmanship, writing, etc.

Why College?: Fact 16 — It is certainly true that one can be successful, wealthy, and influential through his or her vocational activities without having attended a college or university. However, such men and women succeed in spite of the fact. A well-known college president made the following remarks, regarding college education, to the senior class of a private secondary boys' school, "College education aims to teach two major things: first, how to be a man among men; and second, the art of studying." Both of these are most important.

Vocational Dictates: Fact 17 — Your native aptitudes and abilities and favorable scholastic subjects should dictate the field of vocations for you to study and select.

Original Choice: Fact 18 — Many people are very successful in a vocation that was *not* their *original* desire.

A Sad But True Result: Fact 19 — Few, indeed, are those who are enjoying success in any vocation where their major qualifications are only desires. Note this contrast with fact No. 18.

Ideal Combination: Fact 20 — The *ideal vocation* is one which combines your innate abilities and scholastic dictates with your desire. Always remember that one must complement the other. This is the answer to "abilities versus desires."

Strike While the Iron Is Hot: Fact 21 — Many of our leading executives and operators claim that their success was largely due to recognizing and grasping the opportunity of responsibility when and wherever it happened to present itself.

We have today a certain man who is president of one of our largest *electric* companies, who formerly was president of a large *gas* utility. This same man was president of one of our largest *railroad* systems prior to his gas company affiliation.

The president of a large steel corporation was first a lawyer — not a steel man, chemist, or engineer.

There are many successful men and women whose careers are examples of starting in one vocation, following several different ones, and closing their lifework as the directing head of an entirely different business.

The point is, first, make a start in a carefully selected vocation; secondly, work hard, study and learn everything regarding your position and those positions directly above yours, and finally, refrain from trying to solve the distant future but study to appreciate and accept a real opportunity when it knocks at your door. A substantial advance in salary may be a poor excuse to sever your present business connection, while a change involving a reduction in salary may be a blessing in disguise.

Where Science Ends, Faith Begins: Fact 22 — Despite the fact that vocational guidance is uncertain and indefinite as it relates to science, we can feel greatly encouraged in knowing that there exist wonderful opportunities to inform and help ourselves.

The shocking number of vocational misfits now at work, together with the large number of freshmen in college who do not know what they should study in preparation for a successful career, *can* all be *greatly* reduced by providing ways and means of utilizing the present helpful and sound information which is readily available and can be readily comprehended, studied, and mastered.

Steppingstones Versus Tombstones: Fact 23 — It is true that many individuals who possess desirable and qualifying aptitudes, abilities, and scholarly grades incident to the vocation of their choice, have been partial and even complete failures. Success is dependent upon the appreciation and manifestation of the following requisites:

a) A real desire to follow a certain vocation

b) Definite aptitudes and abilities

c) Definite scholastic subject and grades

d) Definite physical and mental capacities

e) Personality to win favor

f) Supreme co-operation and efficiency

g) Ability to withstand disappointment and discouragement

h) Ability to withstand temptation and fraud

i) Great respect and tolerance for the rights of others

j) Conception and execution of services required

k) Conception and execution of moral obligations

l) The ability to command respect and confidence

m) The timely exercise of intelligent discretion

n) Solicitation of counsel and intelligent advice

o) Development and manifestation of self-confidence and will power

p) Demonstration of continual reliability, temperance, and loyalty

Most failures are due either to the lack of, or violation of, one or more of the foregoing requisites.

Group picture taken at the Third Annual Conference on Industrial Education held at the Pennsylvania State College on October 21, 1950. Photograph submitted by Dr. S. Lewis Land, Director, Vocational Teacher Education, The Pennsylvania State College, State College, Pa.

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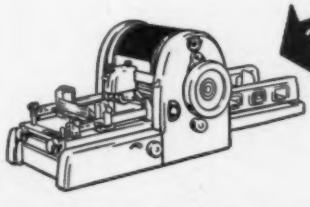

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There once was an apprentice carpenter Who had never learned to use a hammer . . .

. . . because there was only one hammer in his school's shop and you had to go to the tool room and check it out.

That was too much trouble, so he learned to use any convenient rock, brick, or chunk of wood.

You say it couldn't happen? In some schools it happens every day with another important tool — books.

With only a few copies of a book either on the classroom reference shelf or in the library, the trainee's chance of learning to use books is very small. In school many of his questions are a needless burden on his instructor. After leaving school he must depend on "accidentally acquired information" and the "trial-and-error method" in order to progress.

Hundreds of our leading vocational schools have learned the efficiency of placing a book in each trainee's hands. As they observe the progress of their graduates in years to come, they will have proof of the logic of this practice.

Following are a few of the American Tech-books which are now provided for each trainee in hundreds of schools. Check those you would like to have on 30-day examination.

☐ **Fundamentals of Carpentry**—Tools, Materials, Practice: Durbahn

☐ **Fundamentals of Carpentry**—Practical Construction: Durbahn

☐ **Automotive Fundamentals:** Frazee-Bedell

☐ **Mathematics for Industry:** Rusinoff

☐ **Machine Shop Work:** Shuman

☐ **Graphic Arts Procedures:** Karch

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ASSOCIATION NEWS

(Continued from page 4A)

fully cognizant of the social, economic, religious, and recreational life of their students.

The need for the school, and especially industrial arts, to improve the life of its community, was stressed by Thomas D. Bailey, state superintendent of public instruction, Tallahassee, Fla.

John Hurley, acting director of industrial arts, Elementary and Junior High School, Brooklyn, N. Y., and his panel still further emphasized the need of knowing the community and through it, more of other nations.

Dr. Verne C. Fryklund, president, The Stout Institute, Menomonie, Wis., presided at the Wednesday afternoon meeting at which a "Modern Program of Technics" was discussed. This opened a wide field of divergent opinions on the teaching of students and of teacher trainees.

George B. Cox presided over the Thursday morning session. "Leadership in Industrial Arts" formed the main subject for this discussion.

The relationship of industrial arts to vocational education, of supervisors to teachers, of teachers to pupils, of employers to employees were all mentioned.

The afternoon session on Thursday was set aside for visiting the commercial exhibits at the Municipal Auditorium.

The Friday morning session was presided over by Gordon Johnson, instructor, Shortridge High School, Indianapolis, Ind. "Industrial Arts and the National Picture" was the theme of the discussions.

John R. Ludington, specialist for industrial arts, U. S. Office of Education, Washington, D. C., showed how the Office of Education functions in the total educational field of our country. He described the beginnings of manual training and how it gradually changed into our present industrial-arts setup. He also pointed out how we must strive to make the student more adjustable to industrial requirements as workers, consumers, and as better members of society.

Mott B. Heath, manager, Industrial Arts Awards, Ford Motor Company, Dearborn, Mich., explained the Ford Motor Company's plan for next year's Industrial Arts Awards program.

Gordon O. Wilber, director, division of industrial arts, State Teachers College, Oswego, N. Y., presented colored slides on industrial arts laboratories, tool boards, etc.

Marshall Hurst, president, Florida Industrial Arts Association, and Co-ordinator of Industrial Arts, Miami, Fla., was chairman of the session on industrial-arts demonstrations. These presented how the school shop can make use of native materials, ceramics, plastics, etc.; also how meager shop equipment can be augmented by well-planned, homemade teacher aids, and self-built machines, and physical equipment.

Agricultural Education

As usual this energetic group of schoolmen had a well-planned and heavy convention program, which embraced not only many sessions on such subjects as "Vocational Agriculture in the Total School Program," "Research in Agricultural Education," "Selection of Prospective Teachers," but also a number of breakfast and luncheon meetings at which to discuss their many problems.

They also had the usual instructive tour planned to give the agricultural convention visitors a good idea of the agricultural practices in the region in and adjacent to the convention city.

Industrial Education

At the various sessions of the industrial education section, the problems of industrial teacher training, state and local supervision, trade and industrial training, new developments in graphic arts education, co-operative training, and extension training with itinerant instructors were all thoroughly discussed.

Other subjects studied were training for the automotive industry, the training of practical nurses, apprentice training, and technical training on the post-high level.

Vocational Guidance

This section of the A.V.A. discussed the selection of vocational courses, educational and occupational information, and the implication of the 1950 census for teachers of vocational subjects.

Industrial Exhibits

The industrial exhibits again were very interesting, and considering everything, very extensive. Fifty-five companies were there to show and demonstrate their wares. The school exhibits also were excellent.

Resolutions

The resolutions committee composed of Jack Milligan, Michigan (Business Education); O. H. Beaty, Kansas (Industrial Education); George E. Mowrer, Missouri (Guidance); Wm. R. Mason, Ohio (Industrial Arts); Herbert Shaddix, Mississippi (Distributive); Alfred Bunger, Colorado (Agriculture); and Mary Lois Williamson, Kentucky (Home Economics), chairman; submitted resolutions on the following: (1) appreciation of the work done by the convention arrangement committee; (2) a sincere tribute to Dr. L. H. Dennis, retiring executive secretary, for his untiring efforts to make the A.V.A. what it is today; (3) a pledge of loyalty to Dr. M. D. Mobley, the newly appointed executive secretary; (4) a vote of appreciation to the members of the staff of the U. S. Office of Education for its helpful assistance to vocational education; (5) the need of emergency training, national defense, guidance services, and veterans training programs; (6) standards for industrial arts and vocational education, life adjustment program, and research; (7) George-Barden appropriations, convention program planning; (8) a study to be made to enable teachers to attend the A.V.A. convention; (9) foster the development of more student organizations; (10) make efforts to keep vocational rehabilitation under the supervision of the state boards of vocational education.

The newly elected officers of the A.V.A. are: President, H. C. Fetterolf (one year), chief, agricultural education, Pennsylvania; vice-president for Business Education (one year), John A. Beaumont, state supervisor of business education, Illinois; vice-president for Distributive Education (three years), Donovan R. Armstrong, state supervisor of distributive education, Louisiana; vice-president for Home Economics (three years), Miss Martha Creighton, professor of home economics education, Virginia Polytechnic Institute, Blacksburg, Va.; vice-president for Industrial Arts (three years), Roy G. Fales, chief, bureau of industrial arts, New York; treasurer, Charles W. Sylvester (one year), assistant superintendent of schools, Baltimore, Md.

Veteran Administration finance offices certified a new high of 80,000,000 checks to veterans and their dependents during the fiscal year ended June 30. The checks, averaging $83.62 each, went for payments authorized by law, such as compensation and pension, education and training and insurance.

ANNUAL MEETING OF THE WISCONSIN INDUSTRIAL ARTS ASSOCIATION

The Wisconsin Industrial Arts Association held its annual meeting in Milwaukee on November 2, 1950, in connection with the Wisconsin Education Association convention.

(Continued on page 18A)

In TODAY'S *Graphic Arts Instruction*

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ASSOCIATION NEWS

(Continued from page 16A)

Robert A. Ewens, executive vice-president of the Wisconsin Manufacturers' Association, gave the main address at this meeting on "What Industry Expects of Industrial Arts." Mr. Ewens emphasized the need for close co-operation between industry and education, and pointed out the importance of developing in both students and employees the idea of personal responsibility for their own welfare and the continued existence of individual opportunities in the American way of life. Mr. Ewens also reported the fact that he obtained approval for a blanket insurance policy covering all possible liability of Wisconsin teachers while conducting students on tours through industrial plants.

Officers elected at the meeting were Bernard Hagen, president; Ken Pederson, vice-president; and H. J. Shufelt, secretary-treasurer.

Industrial-arts group meetings were held on Friday afternoon. The subjects covered were general metal, woodworking, general shop, printing, mechanical drawing, and machine shop.

WISCONSIN VOCATIONAL AND ADULT EDUCATION MEETING

The W.V.A.E. association held its annual meeting in conjunction with the convention of the Wisconsin Education Association on Thursday afternoon, November 1, 1950, at the Schroeder Hotel, Milwaukee, Wis.

C. D. Rejahl, Madison, was chairman. The main speaker at this meeting was Kenneth W. Hoagensen, director of public relations, Allis-Chalmers Mfg. Co., West Allis, Wis.

His subject was "What Kind of Salesman Are You?"

EPT CHAPTER STARTED AT DETROIT

A new chapter of Epsilon Pi Tau, Alpha Omicros, was installed at Wayne University in Detroit, Saturday, November 4, 1950. Present for the installation were delegations from Ball State Teachers College, Muncie, Ind.; Miami University, Oxford, Ohio; State Teachers College, Buffalo, N. Y.; State University, Bowling Green, Ohio; State University, Kent, Ohio; and The Stout Institute, Menomonie, Wis. Individuals from Ohio State University, Columbus, Ohio; State College, Corvallis, Ore.; State College, Oswego, N. Y.; and the Los Angeles Field Chapter were also present. Stout was represented by Robert Swanson, Charles Shiferl, Lewis Mallow, Garth Wilcox, and John Brandt. The Stout group traveled a greater distance than any of the other delegations.

Dr. William E. Warner, founder of Epsilon Pi Tau, formally accepted the University's petition for membership on behalf of the Corporation of Epsilon Pi Tau.

Dr. Gordon O. Wilber, chairman of the board of trustees, presented the charter to the student president, Ralph Bohn.

Dean Waldo E. Lessenger, College of Education, Wayne University, accepted on behalf of the College.

THE 1950–51 OFFICERS OF THE WASHINGTON VOCATIONAL ASSOCIATION

The new officers elected by W.V.A. for 1950–51 are as follows: Alan Duncan, Edison Technical School, Seattle, Wash., president; Glen Ziegler, Deming, Wash., vice-president for agriculture; Louise Bunge, Edmonds, Wash., vice-president for home economics; Ward Storer, Bremerton, Wash., vice-president for trade and industry; Vernon K. Harmon, Clarkston, Wash., vice-president for distributive education; Frank Naren, Spokane, Wash., vice-president for rehabilitation; and Margaret Wise, Edison Technical School, Seattle, Wash., secretary-treasurer.

COMING CONVENTIONS

Dec. 27–30. **National Science Teachers Association**, at Cleveland, Ohio. Secretary, Manor A. Webb, George Peabody College, Nashville, Tenn.

Dec. 27–29. **National Council of Teachers of Mathematics**, at Gainesville, Fla. Headquarters, University of Florida.

♦ The third annual Chicago Area Career Conference for high school and junior college students of Chicago and suburbs will be held December 27, 28, and 29 at Illinois Institute of Technology. Sponsors are the *Chicago Sun & Times*, the Chicago Technical Council, and Illinois Tech.

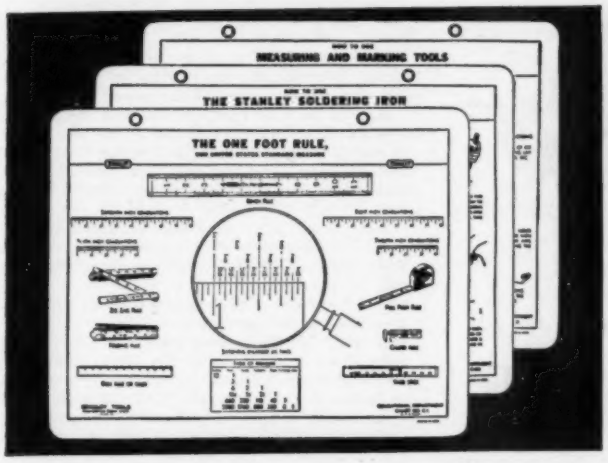
Scheduled throughout the three days are 200 one-hour counseling sessions on 70 different professions in business, industry, and education. The sessions will cover advantages, disadvantages, and opportunities in each of these professions.

This Conference is endorsed by the parochial and the Chicago public school systems.

Releasing figures compiled by the Bureau of Apprenticeship, in co-operation with state apprenticeship agencies, according to W. F. Patterson of the U. S. Department of Labor, Bureau of Apprenticeship, show that of the 17,192 registered apprentices in occupations listed by the Secretary of Labor as critical to the war production effort, 70 per cent are concentrated in 10 states.

New! Stanley Instruction Charts

38 CHARTS — 27½" x 20½"



If you have used Stanley Instruction Charts in your classes, you know they're a big help in teaching proper tool care and use. And now for the first time in almost ten years these charts are available again in a *new* large size. They have been fully revised, with six new ones added. 38 charts in all — they give all the important tool facts for common woodworking and several metal-working tools. And the extra large size, 27½" x 20½", makes it easy for a large group to read them. Sold at cost, $5.50 a set, delivered anywhere in the U. S. In Canada, $8.50 postpaid.

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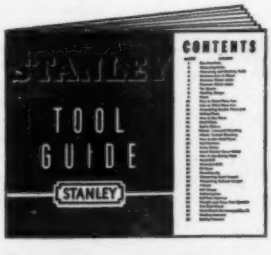
(Revised Edition)

For your students, Stanley offers the Revised Edition of the Tool Guide. Pages carry the same material as the large charts described above—38 in all—and are perforated and punched for 3-ring notebooks. Single copies are $.25 in the U. S. Ten or more, $.15 each. In Canada, 25c each. Prices cover postage.



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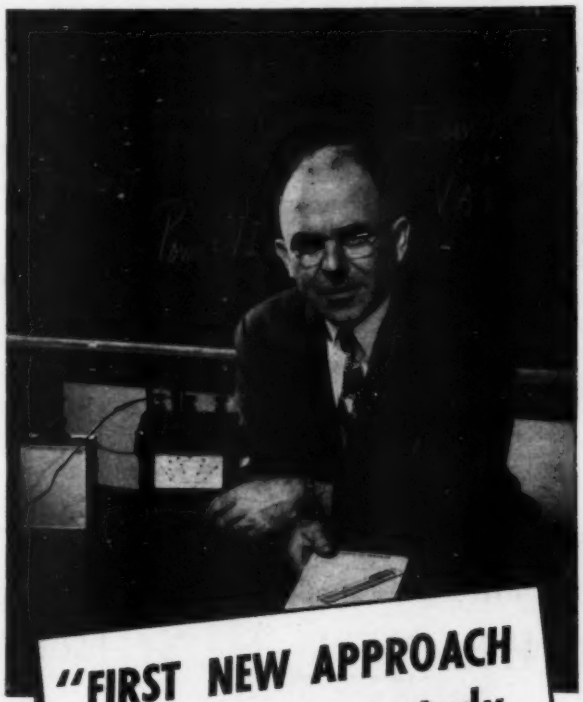

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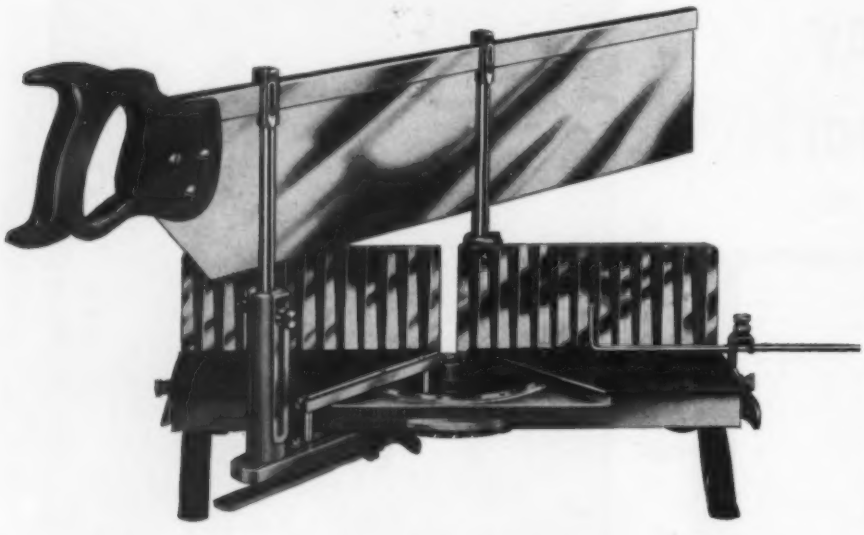

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Personal News

UNVEIL PLAQUE TO O. B. LINDHOLM

Friends and relatives of the late O. B. Lindholm, head of the Vocational School at Waukesha, Wis., for 25 years, gathered at the school recently to pay tribute to and dedicate the school in his honor.

Speakers included men and women from all over the state who had known the educator before and during his work in Waukesha. A plaque was unveiled in his honor, formally naming the school the O. B. Lindholm Vocational School.

Throughout the two-hour period, speakers told about Lindholm's early work with the youth of Waukesha and other Wisconsin cities. They told of his kindness and understanding, his generosity and his accomplishments. About 200 persons were in attendance at the ceremony. In attendance also were two of the late director's grandsons and two of his sons.

CHARLES R. WASSER DIES

Charles R. Wasser, 63, associate professor of industrial and vocational education at Kansas State Teachers College of Pittsburg, died from a heart ailment, Sunday, February 26.

Professor Wasser was in charge of woodworking, cabinetmaking, and wood technology. He was a member of Epsilon Pi Tau, the American Vocational Association, and the Kansas Industrial Arts and Vocational Association.

Born December 16, 1886, in Durham, Pa., Professor Wasser came to the College in 1915, from Lafayette College, Easton, Pa., where he had been on the engineering faculty from 1912 through 1914. He received his early education in the Williamson Trade School at Media, Pa., being graduated in 1908. He was a journeyman mechanic with Bethlehem Steel and the Ingersoll-Rand Company. He attended the Teachers College, Columbia University, from 1910 to 1912, and received his B.S. degree at the College here in 1927. His master's degree was received at the University of Missouri.

He is survived by his widow and two daughters. — *Dr. O. A. Hankammer.*

FLOYD R. LOVE DIES

Floyd R. Love, 65, who developed the vocational training program in the schools of Stockton, Calif., died recently after being in failing health several months.

Mr. Love came to Stockton in 1910 and has served continuously since then as head of the expanding school vocational training program.

He was born at Freeport, Ill., and obtained his first job in a carriage shop there. He also learned carpentry. He received his teacher training at DeKalb, Ill., and became the first full-time manual training teacher at Stockton, Calif., in 1910.

Nine years later Mr. Love introduced vocational training into the school system, starting with printing, machine shop, auto mechanics, and mill cabinetwork.

The course now has expanded to 13 titles with a staff of forty instructors.

In 1922 Mr. Love took charge of the continuation division and through his efforts the Schneider Vocational School was constructed. He also inaugurated the apprentice training system, and contributed much to vocational education in California, and through his writing, to the country at large.

♦ RAYMOND D. MEADE, associate professor of education, and former director of the Korea Technical Institute, has been named director of placement and co-operative education at Illinois Institute of Technology.

He replaces Harold L. Minkler who resigned to accept a post as supervisor of technical personnel in the industrial relations department of the aircraft engine division of the Ford Motor Company.

Mr. Meade received his bachelor of science degree at the University of Oklahoma in 1923 after overseas service in World War I. He was awarded his master's degree in 1933 at the University of Chicago.

He became registrar and associate professor at Illinois Tech in 1948. In May, 1950, he was named director of the Korea Technical Institute established by the Economic Co-operation Administration under the direction of Illinois Tech. He arrived in Korea May 29 and was joined in Seoul by the other 22 members of his staff June 25, six hours before the invasion of South Korea.

The group was evacuated to Japan by air on the last plane to leave the beleaguered capital, and returned to the United States in September.

♦ WALTER C. TROY, 34, has been named assistant chairman of the metals research department at Armour Research Foundation of Illinois Institute of Technology.

In his new position, Mr. Troy will concentrate on special administrative problems and will be technical assistant to Dr. Swartz. He will also remain supervisor of heat treating and powder metallurgy research.

Mr. Troy received his bachelor's degree from the University of Notre Dame in 1933 and later attended Carnegie Institute of Technology. He spent nine years with Westinghouse Electric Corporation before joining the Foundation in 1947.

♦ ROSCOE GUERNSEY, JR., assistant professor of mechanics at the University of Texas, has been awarded a $2,500 fellowship established at Illinois Institute of Technology by the Research Corporation, Brooklyn, for study in photoelastic stress analysis.

The fellowship, leading to a doctor's degree in mechanics, provides for a research project in three-dimensional photoelasticity.

Mr. Guernsey, a native of Leonia, N. J., received his bachelor of arts degree at Columbia University in 1938, and his master's degree there in 1940. Since that time, he has taught at the University of Texas.

♦ ROBERT H. SEAVY was appointed assistant director of the Graduate School and the Industries Training School of Stevens Institute of Technology, Castle Point, Hoboken, N. J., with the title of assistant professor.

Mr. Seavy received the master of science degree at Stevens in 1948. Since his graduation from Pennsylvania State College in 1942 he has been connected with the teaching staff in the department of chemistry at Stevens since 1946. During the war he spent two years with the U. S. Army in India.

♦ LEO ENSMAN has been appointed to the faculty in the industrial education department of Kansas State Teachers College, Pittsburgh, Kans.

Mr. Ensman received his B.S. at Pittsburgh in 1947 and his M.S. in 1950. He is married and has a child four years old.

He was employed by North American Aviation, Los Angeles, as a jig maker 1940–42. He then joined the army in which he served with the transportation corps until late in 1945. After his discharge, he was placed in charge of the industrial-arts department at Wichita Cathedral High School.

Ensman is a charter member of the local chapter of Epsilon Pi Tau.

For the past year he has been serving as a graduate assistant in the woodworking department. His present position will be that of instructor in charge of the industrial-arts woodworking department.

♦ BURTON K. THORN joined the staff of the State Office of Vocational Education, Lansing, Mich., as supervisor of vocational agricultural education, on July 3. He replaces Conrad White, who left the department on June 30.

Mr. Thorn was formerly instructor of vocational agriculture in the Okemos public schools. He has also taught in the public schools of Ubly, Adrian, Mason, and Concord, and for two years was farm superintendent and teacher of agriculture on the Washington farm of Wayne University.

♦ FRANK E. SANDBERG, 79, a woodworking instructor at Boys' Technical High School, Milwaukee, Wis., for 33 years, died on November 21, 1950, at Mercy Hospital after a short illness.

Mr. Sandberg retired nine years ago. He was born in Sweden and came to the United States in 1891. He was a foreman at the Union Interior Finish Co., Chicago, Ill., before moving to Milwaukee.

Surviving are four sons and one daughter.

♦ JOHN W. DOUGHERTY, up until recently director of industrial arts, Oakwood High School, Oakwood, Dayton, Ohio, has retired.

He was born June 1, 1887, at Haydenville, Ohio. He received his B.S. degree from the University of Pennsylvania, and his M.A. degree from Ohio State University.

Mr. Dougherty taught English at Castle Heights Military Academy, Lebanon, Tenn., and at Georgia School of Technology, Atlanta, Ga. Then he was appointed teacher of industrial arts at New Harmony High School, New Harmony, Ind., and then was made director of industrial arts at the Oakwood High School, which position he held until his retirement.

He has written for professional periodicals, and is the author of *Pottery Made Easy* published by The Bruce Publishing Company, Milwaukee 1, Wis.

♦ Recent graduates from the department of vocational education, New York University, who obtained positions to teach outside of New York City are: JOSEPH AGNELLO, Philadelphia, Pa.; LUCIEN AULETTA, Maybrook High School, Maybrook, N. Y.; JAMES BENEDICT, Dalton High School, Dalton, N. Y.; ADOLPH HAUSMAN, Philadelphia, Pa.; CLARK B. HENRY, Ellenville High School, Ellenville, N. Y.; FREDERICK KOWALSKI, New Hyde Park, N. Y.; GEORGE PETRAKIS, Lincoln High School, Philadelphia, Pa.; LEON SKRIPCHUK, Hamburg High School, Hamburg, N. J.; JAMES GILSON SMITH, Otisville, N. Y.; JOSEPH SPIEGEL, Stonybrook School, Stonybrook, N. Y.; OTTO SUPLISKI, Yonkers, N. Y.; and JOHN VERGARI, White Plains, N. Y.

♦ New appointments as teaching fellows to the staff of the Department of Vocational Education, School of Education, New York University, are: MRS. WILMA MCLEAN TUCCIARONE, who received a teaching fellowship and is working in the Ceramic Shop for the fall and spring term, 1950–51. Mrs. Tucciarone formerly taught art at the Hempstead High School and was also assistant art editor for the American Book Company. She is a graduate of Alfred State College of Ceramics.

♦ IRVING BERCHUCK, a graduate of New York University, received a teaching fellowship for the fall and spring term, 1950–51, and will work in the craft shop and industrial-arts shops.

♦ EDWARD J. RYAN is the new instructor of industrial arts at Sikeston, Mo. General shop classes and unit shop classes in woodworking and mechanical drawing make up the program. Dean Owen teaches the class in mechanical drawing.

♦ ALLEN E. POLLOCK was transferred from Paseo High School to Manual High and Vocational School in Kansas City, Mo. At Paseo he taught general metals to industrial-arts classes. At Manual he has fifty students in vocational machine shop.

(Continued on next page)

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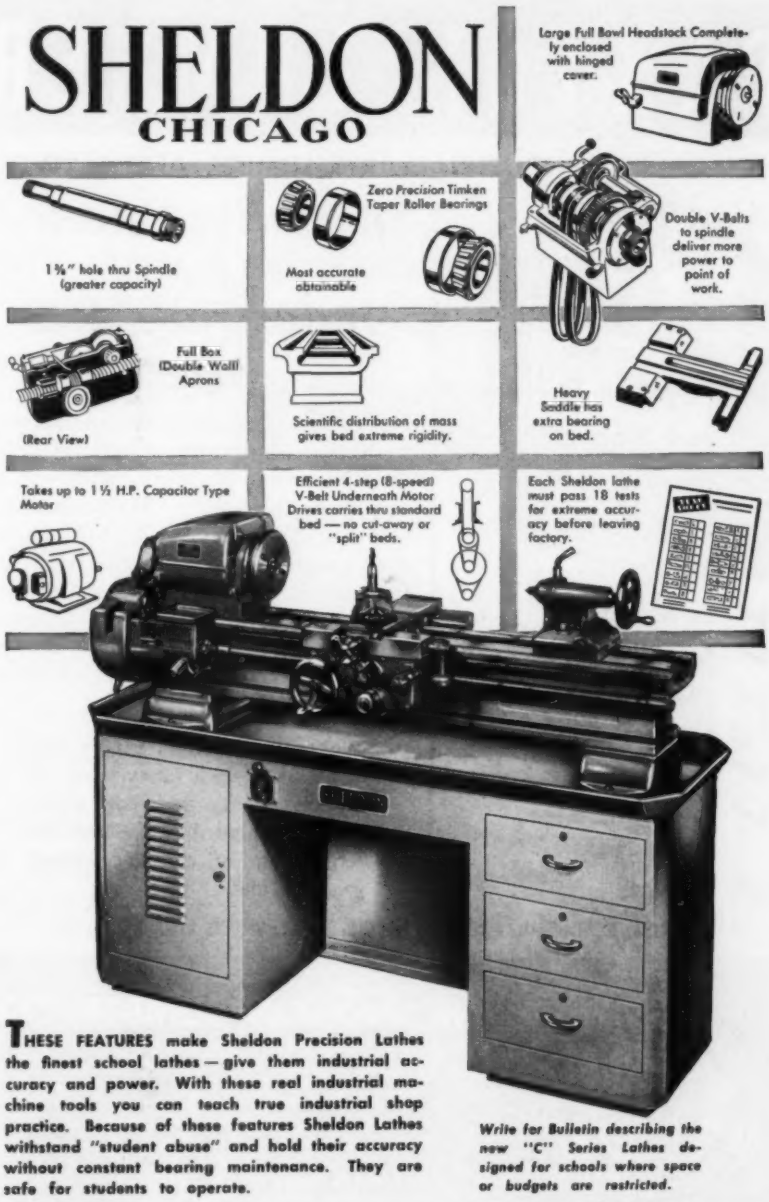
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PERSONAL NEWS

(Continued from previous page)

♦ CLARENCE WETZEL taught vocational industrial courses in the Colorado A. & M. College during the first term of the 1950 summer session.

Later in the summer he offered the courses — Principles and Organization of Vocational Education, and Methods in Secondary Education — in the second term of the summer quarter at the University of Colorado.

This was the twenty-fourth summer that he has spent on the campus of Colorado A. & M. College either as a student or as a visiting professor.

♦ HARVEY B. CAMPBELL, who taught in the Kansas City, Mo., schools for more than 40 years, died September 22. Mr. Campbell had been a practicing architect and teacher of drafting at Lathrop Manual High and Vocational and the Junior College.

News Notes

♦ Adult education is getting under way at the High School, St. Charles, Mo., under the supervision of Co-ordinator Verne Kapfer. Classes have been set up in arts and crafts, adult driver training, clothing, foods, typing, wood craft, blueprint reading, machine shop, arc welding, acetylene welding, and shop mathematics.

The faculty for the adult program is composed of Mrs. Helen Collins, Miss Wava Scott, Mrs. Noel Wilkinson, A. N. Gibson, Marlin Walendy, Harry Syrene, Elmer Weber, and Marvin Heembrock.

♦ As the result of rapidly growing popularity of the printing program at the Arkansas State College, four freshman girls enrolled this fall in the graphic-arts department. This is the first time that girls were admitted to this course.

These girls are receiving the benefits of a recently initiated program which provides for the offering of two types of bachelor's degree — a bachelor or science degree with a major in graphic arts and a minor in education.

In addition to these four-year curricula, a two-year course is offered, upon the completion of which the student receives a certificate of proficiency qualifying him as a workman. This shorter course covers the materials, methods, and techniques of printing.

♦ "How Natural Rubber Is Grown" is the title of a 24¾ by 38-in. chart published by the Natural Rubber Bureau, 1631 K St. N.W., Washington 6, D. C.

Twenty-seven half tones graphically depict how rubber is raised and processed in Malaya, and each picture is clearly explained by a brief paragraph.

This chart can be used as related subject matter in many types of classes.

For further information write to the Natural Rubber Bureau.

♦ Teachers will welcome the "Black Board Buddy," a new chalk holding device, which eliminates all undesirable features of chalk, such as breakage, because the Buddy holds a piece of chalk to the last ½ in. All that is required is to insert chalk and tighten the cap.

♦ "Facts About Oil," is the title of a 31-page, 8½ by 11-in. booklet on the domestic oil industry. This material has been published by the Department of Information of the American Petroleum Institute.

The booklet is an informative summary intended for use as reference and background by speakers, editors, students, writers, and others needing a quick, handy guide to up-to-date information. It is not intended as a narrative story of petroleum.

The facts and figures are departmentalized for the convenience of the user under the following headings: oil, its origin and progress; exploration, drilling, production; reserves; transportation; refining; supply and demand factors; marketing; uses of oil; cost factors; and oil and national security.

For further information write to the American Petroleum Institute, 50 West 50th St., New York 20, N. Y.

♦ Apprentices are cautioned to make sure that the records of their apprentice training are in order when they enter the armed services to avoid confusion and possible loss of credit when they return to civilian life.

The procedure to be followed by the apprentice, employer, and local apprenticeship committee, is as follows:

1. Upon receiving his induction or recall notice, an apprentice should immediately inform his employer, union secretary, and secretary of his local joint apprenticeship committee that he is entering the armed forces. If the apprentice is a veteran, receiving benefits under the provisions of Public Law 346 (G.I. Bill) or Public Law 16, he must also notify his local Veterans Administration office. A failure to do this could result in a forfeiture of a portion of his rights under the law.

Before leaving his job the apprentice should make sure that his work record is up-to-date including his experience on the job and the related instruction he has received and he should obtain a certified copy of this record.

2. He should also obtain a certified copy of the employer's letter notifying the local state apprenticeship council, or the Bureau of Apprenticeship if the state has no council, of his entry into the armed forces.

♦ A new hard-facing catalog has been announced by Air reduction Sales Company, a division of Air Reduction Company, Inc.

(Continued on page 24A)

New and Recent Texts

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UNDERSTANDING RADIO
New Second Edition

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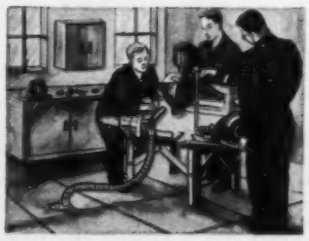

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NEWS NOTES

(Continued from page 22A)

The 20-page, illustrated catalog contains detailed information on the complete Airco line of hard-facing alloys. Description of product, typical uses, mechanical properties, chemical analyses and a brief outline of recommended procedures are included.

For a free copy of this new catalog, write the *Air Reduction Sales Company, A Division of Air Reduction Company, Inc., 60 East 42nd Street, New York 17, N. Y.*

♦ Six new training booklets for foremen and supervisors, called the "Psychology of Safety in Supervision," have just been issued by the National Safety Council. The series is written by Dr. J. L. Rosenstein, industrial psychologist and professor in the department of management, Loyola University, Chicago, Ill.

The names of the booklets are: "You Can't Change Human Nature," "What is Your I.Q.?" "Teaching Safety on the Job," "People Act Alike," "Safety Takes Teamwork," and "You Are Human Too."

Complete sets of the six booklets are offered to members of the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill., at 90 cents per set in quantities of from 1 to 9. Greater quantities at reduced prices. Prices to nonmembers are double those listed.

For more information write to *National Safety Council, 425 N. Michigan Ave., Chicago, Ill.*

♦ A wood study kit has recently been made available by the Timber Engineering Co., 1319 — Eighteenth St. N.W., Washington 6, D. C.

The study kit is a combination of specimens of various species of wood in common use, the tools necessary for their minute examination, and an 84-page manual that will prove equally informative and enjoyable to shop instructors and students of industrial arts and vocational education.

Each kit is packaged in an 8½ by 7½ by 6-in. wooden box, which contains 54 specimens of wood and wood products. The study manual is illustrated with 51 magnified cross sections of familiar woods. A wood-carving knife for cutting smooth surfaces on the ends of the samples and a 10-power magnifying lens for close-up study of the wood structures are included to round out the kit.

The cost of this wood study kit is $8.50.

♦ Job-o-grams, occupational information folders, tell you "What you will have to do, how much you can earn, what the qualifications are, what training is necessary, where to get training, about working conditions, about getting a job, about the future of the job."

For more definite information write to Job-o-grams, suite 2, 123 Waverly Place, New York, N. Y.

♦ During the past year a department of engineering shops and industrial arts was organized at the University of Wichita, Wichita, Kans. Students are offered either a major or a minor in the field of industrial arts through either the College of Education where a bachelor of science degree in education with a major in industrial arts is awarded, or the School of Engineering where a bachelor of science degree in industrial arts is granted. Both programs are four-year curricula.

The men teaching in the department are Roland O. Byers, C. R. Jongedyk, Charles L. Newman, and William E. Nagel. Mr. Nagel has been appointed head of the department.

♦ An industrial-arts general secondary major has been approved at San Francisco State College, San Francisco, Calif.

Courses leading to a master's degree have also been established and the plan for the master's degree is soon to be made available.

Vocational trade and industrial teachers should contact Dwight W. Nichols at the college if they are interested in applying for credit under the Swan Act.

♦ Reynolds Metals Company, Louisville, Ky., has published a 1950 revision of its manual, "Finishes for Aluminum." These books are available without charge to engineers, chemists, production men, and others when requested on a company letterhead.

All types of finishes in each of the various classifications are presented in the book in such a manner that the reader can tell which are the commonly used regular commercial finishes, and which ones are more or less in the experimental stage.

The new edition also contains much data in tabular form including step-by-step schedules for applying various types of finishes, data on properties and characteristics of the aluminum alloys, action of some chemicals on aluminum alloys, and their relative resistance to corrosion.

♦ Television Manual Volume 5, the latest in the Ridge television manual series, is now available at all jobbers of John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y.

It contains the compilation of factory-authorized servicing data, from the point where TV 4 leaves off. The period March through July, 1950, is covered by this big 12 by 15-in. volume.

TV 5 contains schematics, chassis views, voltages, resistance readings, alignment procedures, test patterns, waveforms, parts lists, boosters, tuners, etc. It is priced at $21.

♦ The Lincoln Arc Welding Foundation's Agricultural Award program distributed 141 awards totaling $20,000 to farmers, county agents, teachers, and other agricultural leaders in 43 out of the 48 states. The program offered awards ranging from $50 to $1,755 for the best descriptions of how arc welding is used on the farm to improve farming methods. Men and women in all types of farming activities described the arc welded repair or construction of farm machinery or structures.

♦ The Veterans Education Appeals Board, which was created by Public Law 610 of the 81st Congress, is established to hear appeals by any education or training institution affected by the provisions of the Act, which is dissatisfied with the rate of payment of tuition, fees, or other charges allowed by the V-A in connection with the training provided veterans under the G.I. Bill.

The members appointed to the Board are:

Dr. Charles M. Thompson, dean emeritus of the University of Illinois School of Business. He is a veteran of the Spanish-American War.

Jo Zach Miller III, retired banker and business executive of Kansas City, Mo., a veteran of World War I.

Edward Louis Arpin, formerly a practicing lawyer of Butte, Mont., employed as a Contract specialist in the V-A at the time of his appointment. Mr. Arpin is a veteran of World War II, having served in the navy.

The appointments became effective September 5, 1950. The board will sit in Washington subject to the call of the chairman as appeals are received.

(Continued on page 27A)

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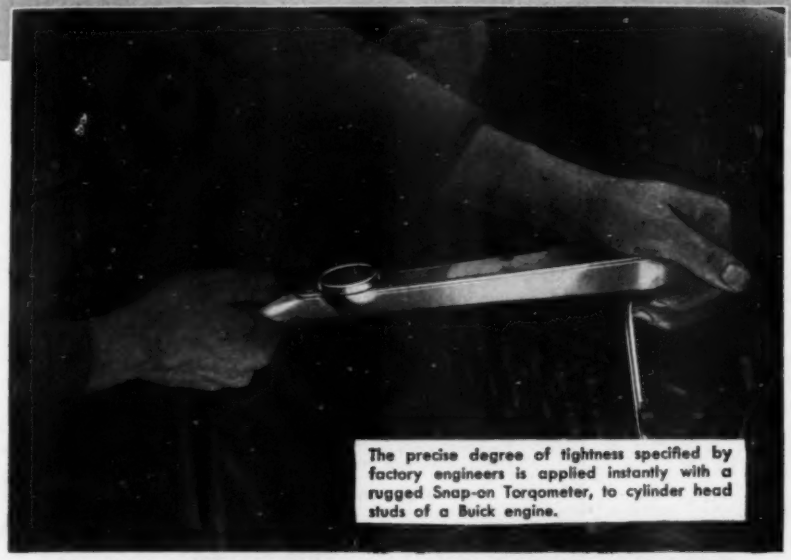

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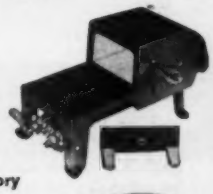

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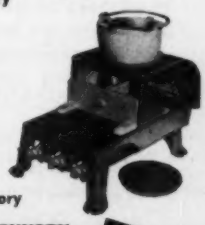

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NEWS NOTES

(Continued from page 24A)

♦ As an important adjunct to classroom instruction, the Timber Engineering Company, an affiliate of the National Lumber Manufacturers Association, is marketing a complete wood study kit.

This new kit has been prepared in response to the widespread demand of educators for practical equipment which is suitable for use in nature studies.

The study kit is packed in an 8½ by 7½ by 6-in. wood box. It contains 54 specimens of important commercial species of wood and wood products which are used in the United States. To make wood identification and general knowledge of wood both entertaining and instructive, a knife, a 10-power hand lens and an 84-page illustrated manual are included.

For further information write to the *Timber Engineering Company, 1319 Eighteenth St., N.W., Washington 6, D. C.*

Questions and Answers

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A.: In order to stop the checking of the teakwood caused by the inequalities of our climate, I found that very thin brush or rag applied coatings of DuPont Penetrating Wood Finish (for floors and furniture) did an excellent job of sealing and satisfying this wood. After the coatings have dried 24 hours or more, the carvings can be stiff brushed with a dry floor scrubbing brush to remove traces of unwanted gloss, in the same way that shoes are brush-polished after waxing. Some care will be necessary to avoid chipping the outer edges of the carvings during this brush work. — *Ralph G. Waring.*

ARTICLES ON SHOP PLANNING

1142. *Q.:* I am seeking information on the subjects of machine shop planning, general shop and electrical shop plans, and shop layouts for industrial-arts shops. What articles published in past issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION would you recommend that I follow? — *H. G.*

A.: The following list of materials which have been published in the past five years in INDUSTRIAL ARTS AND VOCATIONAL EDUCATION contain suggestions and helpful pointers that will be useful to you:

1946 — I.A.V.E.
March, p. 89, "Practical Factors in the Design of All Day Trade Schools"
April, p. 163, "Designing Industrial Arts and Vocational Education Shops and Classrooms"
September, p. 290, "Industrial-Arts Equipment List — Comprehensive General Shop"
October, p. 369, "Third Dimension Shop Layout"

1947 — I.A.V.E.
March, p. 87, "Shop Planning for the Small High School"
March, p. 92, "Plan for the Small General Shop"
March, p. 96, "High School Shop Layouts"
March, p. 97, "Efficient Graphic-Arts Department"
March, p. 106, "Creative Laboratory or Handicraft Shop"
April, p. 141, "How to Make a School Shop Layout"
October, p. 346, "The Tool-Crib Problem"
December, p. 438, "Dressing Up the Toolroom"

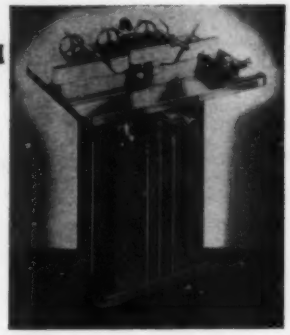
1948 — I.A.V.E.
March, p. 81, "Laying Out the One-Teacher Industrial Arts Department"
March, p. 83, "A Practical Approach to Shop and Laboratory Planning"
March, p. 90, "Floor Plans for Electrical, Machine, Welding, and Woodworking Shops"
March, p. 94, "Shop Layouts"
March, p. 122, "Evaluative Criteria for Vocational-Industrial Schools and Classes"
March, p. 126, "Check List for School Shop Planning"

1949 — I.A.V.E.
March, p. 81, "Industrial Education at the Agricultural and Mechanical College of Texas"
March, p. 91, "Planning School Shops"
March, p. 88, "Practical Shop Layouts for Areas and Work Stations"
March, p. 96, "A Course in School Shop Planning"
March, p. 98, "Tool Storage"
March, p. 100, "Kenosha Builds a New Vocational School"
September, p. 268, "The School-Shop Toolroom"

1950 — I.A.V.E.
January, p. 25, "Dressing Up the Tool Room"
March, p. 83, "Planning School Shops in Baltimore County"
March, p. 89, "The Wausau School of Vocational and Adult Education"
March, p. 95, "Industrial Education at Arkansas A. & M. College"
March, p. 98, "Seattle Modernizes High School Shops"
March, p. 101, "The Tacoma Vocational-Technical School"
March, p. 107, "School Shop Expansion in Sharon, Pa."

(Continued on next page)

The low cost, large capacity
BOICE-CRANE SPINDLE SHAPER



SAFER TOO—

- One piece spindle — No loose stubs.
- Table and spindle designed for "undercutting" setups (cutter under the stock).
- Designed for ample powering to sustain top speed for free, steady cutting.
- Improved guard — Work hold-down.
- Foolproof setups with Boice-Crane "Tru-Form" Safety Cutters.

The one best shaper buy for either your industrial arts or vocational woodworking shops. It is big, rugged, high precision throughout and a really big dollar value.

Makes longer tenons, too! Cope and rabbett at the same time and without a stub shaft. On a Boice-Crane the tenon can be passed under long swing cope cutter.

The large table opening provides for nested table rings. All cutters up to 6¼" dia. lower below table to undercut for greater safety. Undercutting also brings cutters closer to spindle bearings to lessen strain, wear and danger of springing.

Table (has mitre-gauge groove): 20" x 27½". With front wing: 28" x 27½"
Cutter capacity: Up to 6¼" dia. x 3" wide
Vertical spindle travel: 1¾"
Height, floor to table: 35"
Power: Provision for motors to 1½ h.p.
Two models: 7200 or 10,000 r.p.m.

A complete line of individual cutters and sets for cabinet work, mill work, window and storm sash and doors. The new Boice-Crane moderate priced Tru-Form Safety Cutters (with involute relief) assure easier, cleaner, more burn-free cutting. They cut the true, original shape and dimensions throughout their 50% longer life. Improved clearance for high speed shaping for the life of the cutter. Less cutting edge crumbling than straight relief cutters. Precision formed from uniformly deep-hardened fine tungsten tool steel. Razor sharp. Improve performance of any shaper.

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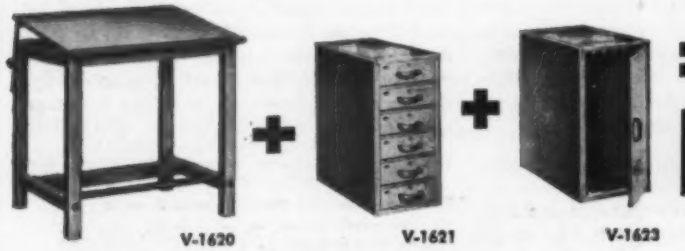
HERE'S HOW IT WORKS—This simple, sturdy, good-looking Student Drafting Table Assembly is composed of three units, giving it real space-saving flexibility. The Assembly consists of the table (V-1620), the tool drawer unit (V-1621) and the board storage unit (V-1623). Storage units can be arranged to make maximum use of floor space.

FOR EXAMPLE—An entire aisle can be eliminated by placing two rows of tables together. The left-hand row would have the tool drawer unit at right-front and the board storage unit at left-rear, opening to the left-hand aisle (as illustrated). Storage unit arrangement in the right-hand row would be reversed.

This Student Drafting Table Assembly is solidly built of Northern Wisconsin Birch, finished in Golden Brown. Find out for yourself about Hamilton's traditional quality and efficient work-design. You'll be amazed at how little it costs . . . see your Hamilton Dealer now . . . or write us for full details.



V-1620 V-1621 V-1623

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ANSWERS TO QUESTIONS

(Continued from previous page)

March, p. 109, "Bergen County Vocational School"
March, p. 110, "Arts and Crafts Shop Plan"
March, p. 112, "Tool and Supply Center for General Shop"
March, p. 113, "Tool Panel Layouts"
March, p. 114, "Tool Cabinet"
April, p. 143, "Unit Carpentry Shop"
April, p. 172, "What Is Needed in a One-Man Shop"
May, p. 195, "Consolidated School Shop Plan"
May, p. 197, "Layouts for General Shops"

—*J. J. M.*

New Publications

Aviation From the Ground Up

By John J. Floherty. Cloth, 157 pp., 5¾ by 8½ in., illus., $2.75. J. B. Lippincott Co., Philadelphia, Pa.

A story, more interesting than a novel, telling all about the evolution of the airplane from the *crate* stage to the present-day jet.

The background of this engaging story was built up by the author who studied the industry through months of close observation in drafting rooms, lofts, assembly lines, and testing laboratories to learn just how airplanes are originated, how they are built, tried out, maintained in service, and flown under all kinds of conditions.

This book ought to be read by the young high school students who want to take up flying. It may save them many heartaches, and start them out in the right way.

Machine Shop Methods

By Lorus J. Milne. Cloth, 376 pp., 6¼ by 9¼ in., illus., $3.75. Prentice-Hall, Inc., New York 11, N. Y.

A book for students in technical and vocational schools who want to learn how to use the power tools found in the machine shop. The tools described are the lathe, drill press, shaper, miller, grinder, and gear cutters. The book also contains chapters on assembling machinery parts, and on the processing and finishing of metals.

Home Mechanic's Outdoor Handbook

By Reginald R. Hawkins and Charles H. Abbe. Cloth, 490 pp., 5⅞ by 8¼ in., illus., $5.95. D. Van Nostrand Co., Inc., New York City.

This book is not only helpful but very interesting.

It gives explicit directions on how to make driveways, walks, steppingstones, curbs, and terraces. The book also explains how to build walls, fireplaces, fences and gates, breezeways, arbors, trellises, and foot bridges.

Directions are also given for putting up small buildings, garden and swimming pools, and tennis courts. The fine illustrations in Chapter 15 devoted to planning the home grounds, will be found full of helpful suggestions.

The book also contains a comprehensive bibliography.

Servicing and Maintaining Farm Tractors

By Elmer J. Johnson and Alvin H. Hollenberg. Cloth, 313 pp., 6⅜ by 9¼ in., illus., $3. McGraw-Hill Book Co., New York, N. Y.

An excellent text and reference book for agricultural students and for the practical farmer. A study of this book, and adoption of the practical advice given therein will cause farm machinery to operate more efficiently and to give service for a much longer time.

The various chapters deal with setting up a servicing and maintenance program, applying tractor power on the farm, operating the tractor safely, lubricating the tractor, servicing and cleaning, maintaining the electrical system, selecting the fuel and servicing the fuel system, servicing the cooling system, repairing tires, locating troubles, and preparing for winter storage and use.

Measuring Educational Achievement

By William J. Micheels and M. Ray Karnes. Cloth, 496 pp., 6¼ by 9¼ in., illus., $4.50. McGraw-Hill Book Co., New York 18, N. Y.

A textbook written by experts in preparing tests and measurements. The teacher who wants to construct his own tests will get a great deal of help out of the lucid explanation given about the construction, evaluation, and improvements of tests that can be used in shop and classroom.

The 17 chapters of the book discuss the kinds and types of evaluating instruments, the purpose of testing, and the criteria of a good test, principles of test construction, the various kinds of tests commonly used, interpreting test data and assigning marks, analyzing and improving tests, and improving instruction.

Everyday Occupations

By Mildred A. Davey, Elizabeth M. Smith, and Theodore R. Myers. Cloth, 451 pp., 6¼ by 9 in., illus. D. C. Heath & Co., Boston, Mass.

This is the second edition of this book which will be found very helpful by the young students who are confronted with the job of making a choice of their future life's work.

The book presents a range of occupations from which the beginner may make his choice.

After each group of job descriptions, there are lists which give the advantages and disadvantages. This permits the student not only to compare the occupations in a given range, but also to evaluate the jobs described in other ranges.

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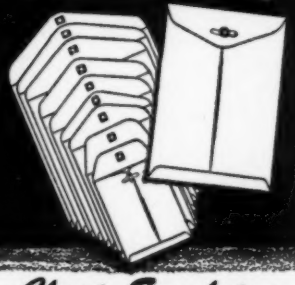

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When you want extra safety and additional protection for your large or bulky materials to be mailed, then you should use a Clasp Envelope. These envelopes are built of rugged, heavy stock, equipped with a burrless metal clasp, and come in a wide variety of sizes. They are used in many cases to carry heavy magazines, machine parts, steel wool, shavings, instruction manuals, photographs, cloth or fabric samples, and similar large items that require complete protection but do not call for the expense of a box container. The clasp feature permits you to insert and extract the contents several times. The clasp also allows you to send material through the mail at third class rates yet guarantees you of a protective seal.

Western stocks 22 sizes ranging from 2½"x 4¼" to 12"x 15½".

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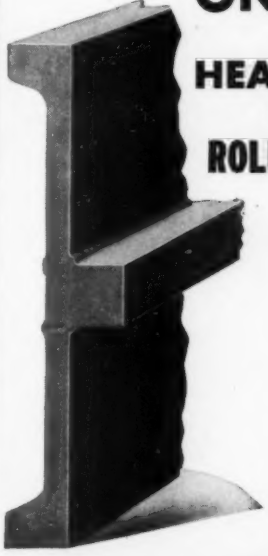


Almost a half century of "Know-How" assures precision-built steel flasks fabricated to highest quality standards. Sterling Flasks have these patented, life-prolonging features: **all-steel welded construction . . . solid reinforcing bars . . . heavy rolled steel flanges . . . square corners . . . full-width bearing.** Available in a variety of styles and shapes. Write for catalog.

STERLING WHEELBARROW CO.
Milwaukee 14, Wis., U. S. A.

SHOP EQUIPMENT NEWS

NEW SOUTH BEND DRILL PRESS

Bulletin No. 402 has been prepared by South Bend Lathe Works to announce their new "Economy Model," bench and floor type, 14-in. drill presses. Complete specifications of these new drill presses as well as prices and a list of dealers are given. Attachments and accessories are also illustrated, described, and priced.

New South Bend drill press

A copy of South Bend Bulletin No. 402 may be obtained by writing to *South Bend Lathe Works, South Bend 22, Ind.*

For brief reference use IAVE—0101.

NEW PORTO-POWER EQUIPMENT

Blackhawk Mfg. Company announces a new Porto-Power assortment of a hydraulic Pull-Ram and various pulling clamps which they designate as the "SB-46 Metal Stretching and Clamping Kit." This hydraulic equipment, which is used with Blackhawk's Standard Bantam Pump and hose, was developed to make reconditioning, repairing, and rebuilding bodies and fenders more profitable.

Porto-Power equipment

The new ½-ton Pull-Ram weighs 4½ lb. It is Spee-D-Coupler equipped, making it interchangeable with other Blackhawk Bantam rams for work that requires pushing or spreading.

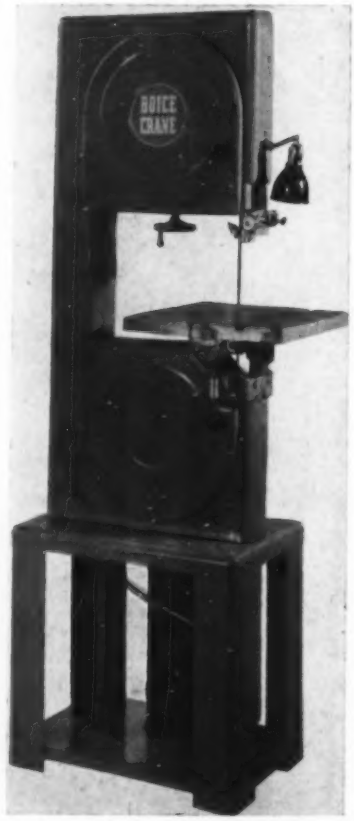
The Blackhawk SB-46 kit includes an RC-612 Pull-Ram, (2) Z-972 Chain Grips, Z-979 Pull Head and 4 Washers, (2) Z-980 Fender Clamps and (2) Z-1005 Body Stretcher Clamps.

Additional information is available from Blackhawk Distributors or from *Blackhawk Mfg. Co., Milwaukee 1, Wis.* Ask for catalog P-50A.

For brief reference use IAVE—0102.

BAND SAWS WITH INDIVIDUAL FLOOR STANDS

New models of band saws mounted on individual open type floor stands have just been



Band saws with individual floor stands

developed by Boice-Crane Co. The addition enlarges the total number of 14-in. band saws in the Boice-Crane line of 12.

Free descriptive literature will be sent to anyone addressing *Boice-Crane Company, 932 Central Avenue, Toledo 6, Ohio.*

For brief reference use IAVE—0103.

FOLLOWER TYPE SHAPER FOR DUPLICATING PARTS

A follower type shaper for duplicating contours on metal parts has recently been brought out by the Cincinnati Shaper Company, Cincinnati, Ohio. The machine is used for automatically shaping contours on dies, clamps, cams, and other parts.

The follower equipment can be supplied on any stroke or size of Cincinnati Shaper. The shaper is a standard machine except for the pad on the base, the masterform holder, and a special table support post. It can be used for regular shaper work as well as automatic duplicating.

The rail elevating screw is disconnected and retracted when duplicating so the table and rail

Cincinnati follower type shaper

are free to move vertically. The rail and table are supported on the masterform by the steel support post equipped with a roller. The masterform to be duplicated is made of ¼-in. steel and clamped in the holder that is secured to the pad on the base. The table progresses horizontally by automatic feed. The table, rail, and work follow the vertical and horizontal movement of the roller as it travels over the masterform.

For further information write to *The Cincinnati Shaper Co., Cincinnati 25, Ohio.*

For brief reference use IAVE—0104.

NEW STARRETT PRECISION TAPES

The L. S. Starrett Company has just introduced a new line of precision case-type steel tapes.

This No. 530 series features a ⅜-in. wide tape line made of highest quality tape steel accurately etched with bright steel graduations on a no-glare black background. These tapes are available in 25-, 50-, 75-, and 100-ft. lengths with quick-

(Continued on page 32A)

New No. 530 series Starrett tapes

EDUCATIONAL
LAMP PROJECTS

Of particular interest to instructors — in woodworking, general shop, plastics, crafts, electricity, and many other shop courses. Students can design and make the body of the lamp. We supply all other parts necessary — sockets, cords, plugs, shades, harps, switches, etc. Over 700 different parts shown in wholesale catalog. A MUST for all instructors interested in keeping students occupied with highly **educational** and **useful** projects. Send today for wholesale price list and parts catalog.

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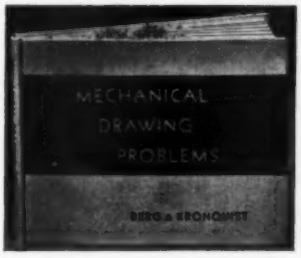
New REVISION
Problems in
ARCHITECTURAL DRAWING

BIGGER & BETTER! For years recognized as one of the best, this text now contains more problems than the old edition . . . includes modern ranch type houses, the latest in public buildings, etc. It still presents those problems small enough for the high school student draftsman to understand — cabins, summer cottages, garages, garden structures, etc.

Divided into 2 main parts — the first covers the scope, design and execution of architectural drafting; has extensive information on wood and masonry construction; and contains valuable tables of designing data. The second consists of 22 progressively arranged problems — practical, buildable projects. By Franklin G. Elwood, resident architect of the famous Moosehaert Colony. His style is simple, clear and straightforward . . . his drawings correct in detail and technique. Only $3.28 ($2.48 each for 5 or more copies).

MECHANICAL DRAWING PROBLEMS



Designed to meet present day standards, this easy-to-read text teaches by example rather than by description or explanation. Emphasizes pencil work and the basic practice in making working drawings. Not confined to one field, it covers the basic language of expression in many fields. Includes pencil technique, use of equipment, picture drawings, projection, working drawings, pattern development and machine drafting. SPECIFICATIONS give verbal instructions . . . LAYOUT supplies graphic directions. Also offers many auxiliary problems. Meets requirements of American Standards Association. Grouped for progressive learning in 2 year high school course. More than 170 illustrations. By Berg & Kronquist. Clothbound, $2.36; paperbound, $1.76.

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First choice among men who use hand tools in their daily tasks, the Plumb hammer is engineered to do better work faster. The springy comfort-grip hickory handle absorbs shocks. The head is constructed of special analysis steel hardened at four separate points. There's no substitute for Plumb quality, one reason why wise dealers won't offer you something "just as good."

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WITH
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NOW AVAILABLE IN 3 SIZES
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Grinding can be done on a cone, coarse or fine oilstone, leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

MUMMERT-DIXON CO.
HANOVER, PENNSYLVANIA
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

SHOP EQUIPMENT NEWS

(Continued from page 30A)

reading graduations in feet, inches, and eighths the entire length of the line. Also in metric or both English and metric graduations.

Cases for these new tapes are of rugged construction, covered with heavy, durable, wear- and weather-resisting artificial leather.

A new feature is the practical, patented folding tape hook mounted on the ring at the end of the tape. The hook folds neatly out of the way when not in use. It enables the tape to be used without assistance when hooked over an edge or projection or inserted into a flat surface such as earth, lumber, etc.

Other Starrett Case-Type Steel Tapes are available with similar features but with wider or narrower tape line.

For complete information write to *The L. S. Starrett Co., Athol, Mass.*

For brief reference use IAVE—0105.

NEW DUAL SPOTLIGHT SOLDERING GUN

Dual spotlights to eliminate shadows, and over/under terminals to brace tip and improve visibility, are features of the new light-duty soldering gun recently announced by Weller Electric Corp., Easton, Pa.

This new model is considerably smaller and lighter than previous, now obsolete, 135-watt guns, and yet has substantially greater soldering capacity.

Dual spotlight soldering gun

Among its advantages are: dual heat (100/135 watts) for all light and delicate soldering, 5-second heating to save time and current, trigger-switch control which adjusts heat to the work and eliminates need of unplugging gun between jobs, chisel-shaped Wellertip for faster heat transfer and speedier soldering, and the dual spotlights and over/under terminal design.

Descriptive catalog bulletin may be obtained by writing *Weller Electric Corp., Easton, Pa.*

For brief reference use IAVE—0106.

HAND POWER TOOL FOR PRECISION WORK

A new "Handee '85'" tool and companion complete-with-accessories kit, the "Handee Workshop," has been announced by the Chicago Wheel and Mfg. Co.

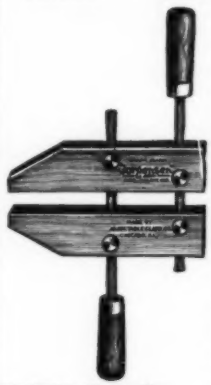
This tool is suited for industrial production lines as well as for fine handicrafting.

Balanced and shaped to fit the hand, the "Handee '85'" has an idling speed of 27,000 r.p.m., and a load speed of 20,000 r.p.m. It weighs two pounds and chucks interchangeable spring collets of 1/16-, 3/32-, and 1/8-in. capacity.

The tool has a cooling arrangement permitting it to run all day without heating up excessively. A steady stream of air weaves and swirls automatically around the motor, keeping its housing comfortably cool to the hand.

(Continued on next page)

SPECIFY AND INSIST UPON GENUINE "Jorgensen" TRADE MARK REG U S PAT OFF



Genuine "JORGENSEN" Handscrews have long been preferred by careful buyers for the school shop. They will stand up under school shop use.

Jaws are clear, straight grain hard maple, properly seasoned and manufactured in our own shop. Cold-drawn steel spindles. Hard maple handles that will not come loose. All parts carefully fitted for smooth, trouble-free operation.

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"PONY" Clamp Fixtures make ideal bar clamps on any length ¾" or ½" black pipe, and will be found to be one of the handiest tools in the shop! Insist on "PONY."

"Jorgensen" and "Pony"

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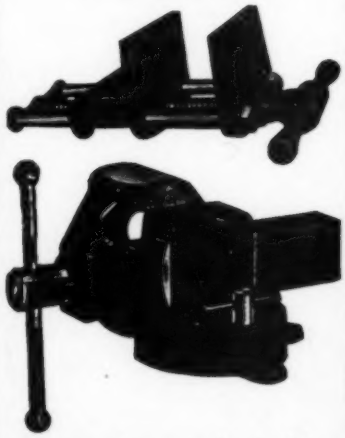

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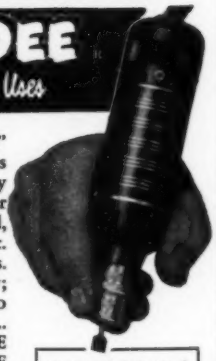

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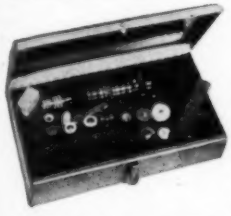

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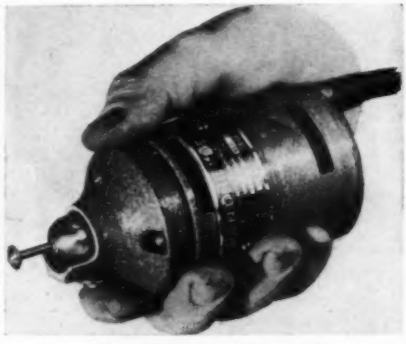

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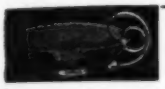

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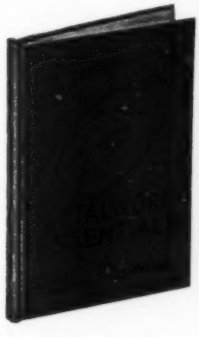

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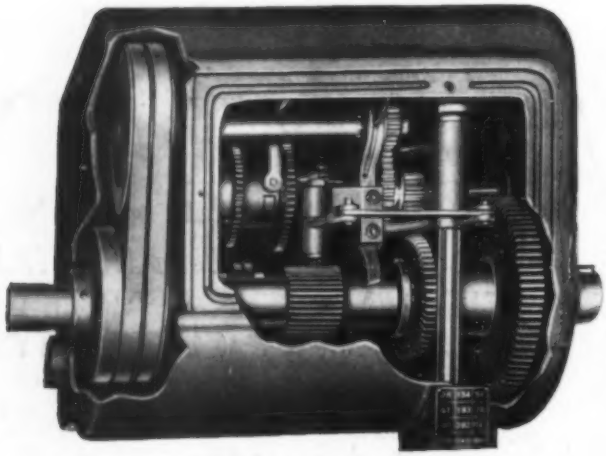

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